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The Process of Making Alcohol.

One of the constituents of all kinds of grain is starch, and by the process of fermentation this starch is converted first into sugar, and then into alcohol. These chemical transformations take place only when the grain is immersed in warm water, consequently alcohol is always made in a mixture with water. When the alcohol is to be consumed in the form of ale or beer, it is not necessary to separate it from the water with which it is mingled, but for innumerable uses in the arts this separation is essential, and it is effected by the process of distillation. As alcohol is transformed into vapor at the temperature of 176°, while water remains at this temperature in a liquid state, it is only necessary to heat the mixed liquids to 176°, when the alcohol rises in vapor, and the water is left behind. The vessel in which the liquids are heated is closed by an air-tight cover, and from this cover a pipe is led and coiled through a cask of cold water; as the alcoholic vapor enters this cold pipe it is condensed to the liquid form. This process of evaporating and condensing a liquid is called distillation; the apparatus is called a still, and the coiled pipe is the "worm of the still."

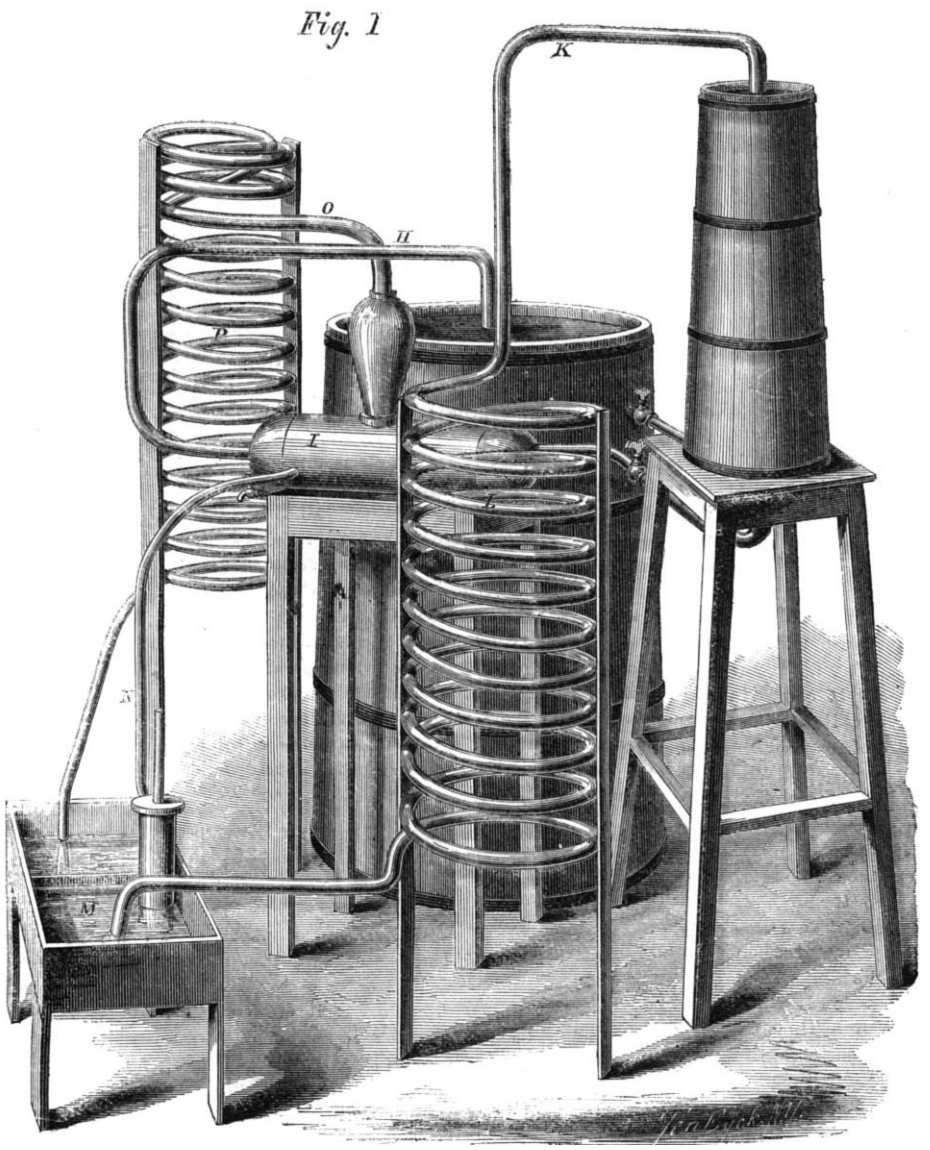
It is not possible by this process to completely separate the alcohol and water, for, though water is wholly converted into steam only at the temperature of 212°, it is partially volatile at lower temperatures, and a portion of it is consequently carried over with the alcohol.

There is also mingled with the alcohol another ingredient which for some purposes it is desirable to remove. This is properly an ether, though it is called by some chemists and by most distillers an essential oil, which gives the peculiar flavor to the different kinds of spirit; one oil being produced from sugar and giving the flavor to rum; another from corn and giving the flavor to corn whisky; another from rye and giving the flavor to rye whisky—each kind of spirit deriving its flavor from its peculiar ether. It so happens that charcoal has the property of absorbing all of these ethers (the quantity of which bears a very small proportion to that of the spirits), and consequently they are eliminated by simply leaching the spirits through charcoal. This process is called rectifying.

In practice, it is customary for distillers in the grain-growing regions of the West to manufacture an article called "high wines," which is alcohol mingled with considerable water and with ethers. This article is sold to refiners—located in New York and other places—who re-distill it to separate it from a portion of the water, and leach it through charred bone-dust to eliminate the essential oil.

Many efforts have been made to obtain alcohol sufficiently pure for use in the arts by improvements in the first distillation, in order to save the expense of re-distilling and rectifying, as well as the cost of transporting the large quantity of water contained in high wines. Though enormous amounts of money have been expended in these efforts, they have been heretofore unsuccessful; but we now have the satisfaction of illustrating an apparatus invented by a practical distiller, who says that he has had it in operation at his distillery in Springfield, Ills., for more than a month, and that he obtains in the place of high wines an article of alcohol which is pronounced by the dealers of this city superior to the ordinary re-distilled and rectified alcohol. These great results are obtained by the introduction of a simple apparatus, which the inventor calls an extractor, by which the wines are re-distilled by dry heat instead of by throwing steam among them as in the ordinary process.

Fig. 1



HOWLETT'S IMPROVEMENT IN DISTILLING.

Fig. 1 of the engraving is a perspective view of the whole still, including the extractor, and Fig. 2 is a vertical section of the still vat.

A is a large wooden vat, 24 feet in hight and 8 feet in diameter at the base, divided by two horizontal diaphragms into three compartments, one above another. The alcohol, mingled with the meal from which it has been extracted and with the water employed in the process, is introduced in successive charges into the upper compartment, B; each charge occupying about one-third of the capacity of the compartment. The compartments, C and D, contain charges which have been let into them from above. Into the lower compartment, D, steam is introduced by the pipe, E, leading from a steam boiler. This steam passes through the beer in the compartment, D, evaporating and carrying with it any alcohol which may remain in this beer. It then passes up through the pipes, F and G, in the direction indicated by the arrows, into the second compartment, C, passing through the beer in this compartment, and carrying forward a portion of its alcohol into the upper compartment, B. Here it encounters the fresh beer, taking out a portion of its alcohol, and, thus strengthened, passes out of the pipe, H, at the top of the vat, through the pipes in the extractor, I, into the lower end of the doubler, J, which contains a charge of lees left from a previous distillation. These lees still hold a portion of alcohol by which the spirit is strengthened as it passes through them, and it is led from the top of the doubler by the pipe, K, to the worm, L, where it is condensed and runs down into the vat, M; being mingled with oil and water, constituting it the first wines.

These first wines are now thrown by Mr. Howlett into his extractor, to separate the alcohol from the essential oil and from a sufficient portion of the water to bring it to the strength of commercial alcohol, suitable for shipment to foreign markets.

By means of a pump driven by the steam engine of the works the first wines are forced up through the pipe, N, into the extractor, I, where the liquid surrounds the pipes through which hot vapors pass, as has been described. Here the alcohol is evaporated, and the vapor passes upward through the ascending coil, O, where most of the water which has been

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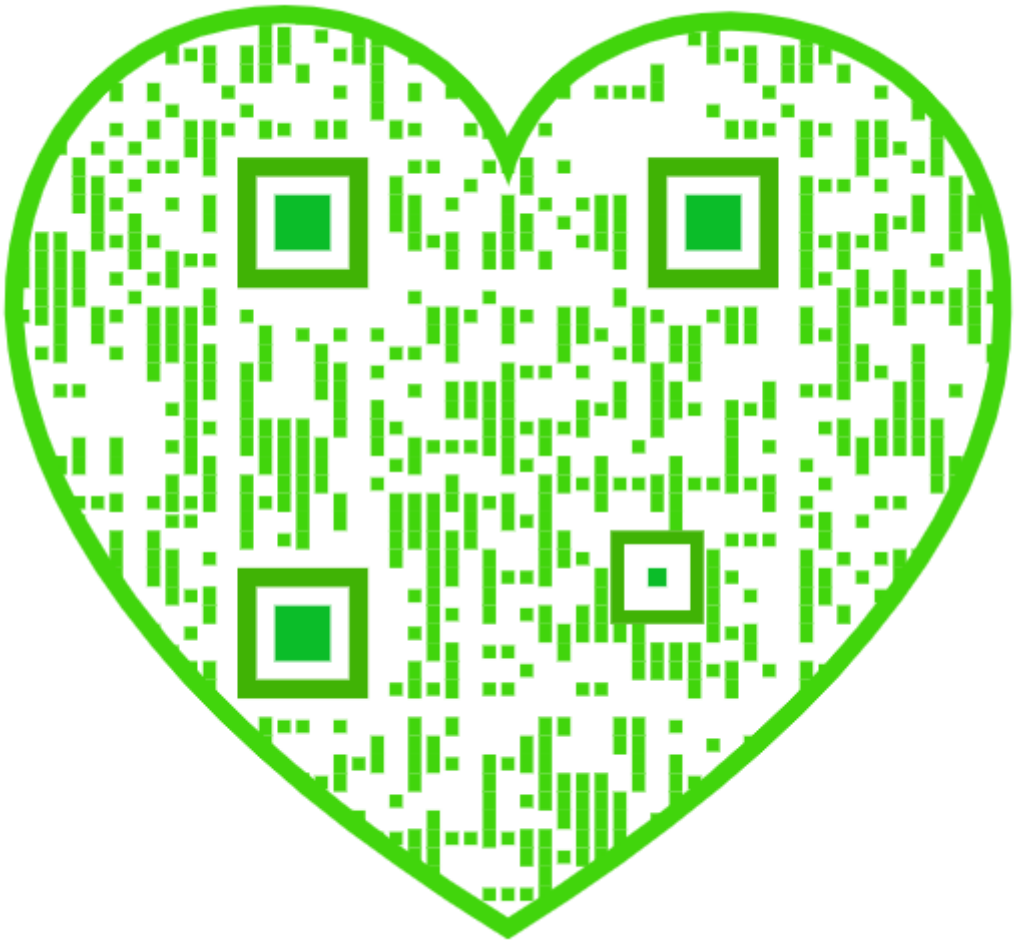
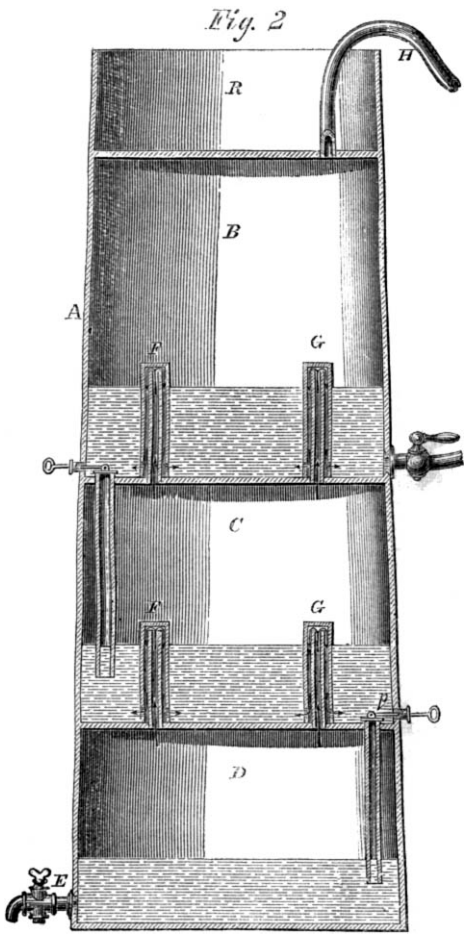


evaporated with it is condensed and trickles back into the extractor, while the vapor of alcohol continues onward and is condensed in the descending worm, P, when it is ready to be barreled.

It will be seen that the separating process depends upon a nice adjustment of the temperatures. Alcohol boils at 176°, water at 212° and the ethers at a somewhat higher temperature, and the distillation is so managed as to drive off the alcohol with only a small portion of the water and without any of the ether. By the use of dry heat, too, instead of steam, the introduction of water into the spirit is avoided.

To complete our description of the process we will explain briefly the manner in which the waste products are discharged. A valve is made in the lower

Fig. 2



compartment, D, of the tub, A, and after the steam has been passing through the beer in this compartment a sufficient length of time to extract its alcohol, the valve is opened, when the pressure of steam blows out the slops, which are used for feeding hogs or cattle. Then the valve, *g*, is opened and the charge in compartment, C, is allowed to fall into the compartment below. B is emptied in the same manner, and a fresh charge is introduced from the charger, R, above. At the same time the lees from the doubler, J, are drawn into the compartment, B. These lees are the water and ether left in the extractor when the alcohol was evaporated from the first wines, and they contain a portion of alcohol which is taken from them by the action of the steam as they repeatedly encounter it in their passage back to the waste pipe.

Each charge in a still of the size here described yields about 25 gallons of spirits, and a fresh charge is introduced every 15 to 30 minutes.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, P. L. Howlett, at Springfield, Ills.

Shameful Waste in the Army.

An army correspondent of the Philadelphia *Gazette* makes the following record of waste in the Army of the Potomac:—There is food for reflection in the enormous waste of provisions by an army, exceeding by far the consumption of the same number of men at home. A contemplation of the various camping grounds vacated by Burnside's army corps during the present week would present a fair illustration. In all the camps the waste was more or less great; but within my limited view, that of the Ninth New Hampshire Regiment was the greatest. There, in one spot, I saw fresh meat enough to compose a good sized calf, which was not in the least spoiled; several barrels of salt beef and pork, and boxes of crackers which I had not time to count. Many of these were open, and had but a small portion of their contents abstracted. Others were in piles, and had not been opened at all. Thus, while thousands in the army are often hungry, other thousands are wasting the food provided for them in the most disgraceful manner. Where are the Quartermasters? Who are they that permit these things?

America—The Granary of the World.

In his book of travels in the United States, recently published, Mr. Trollope says:—I was at Chicago and at Buffalo in October, 1861. I went down to the granaries, and climbed up into the elevators. I saw the wheat running in rivers from one vessel to another, and from railroad vans up into huge bins on the top stories of the warehouses; for there rivers of food run up hill as easily as they do down. I saw corn measured by the forty-bushel measure with as much ease as we measure an ounce of cheese, and with greater rapidity. I ascertained that the work went on, through the week and Sunday, day and night incessantly; rivers of wheat and rivers of maize ever running. I saw men bathed in corn as they distributed it in its flow. I saw bins by the score laden with wheat, in each of which bins there was space for a comfortable residence. I breathed the flour, and drank the flour, and felt myself to be enveloped in a world of breadstuffs. And then I believed, understood, and brought it home to myself as a fact, that here in the corn lands of Michigan, and amid the bluffs of Wisconsin, and on the high table plains of Minnesota, and the prairies of Illinois, God had prepared the food for the increasing millions of the Eastern World, as also for the coming millions of the Western. I began to know what it was for a country to overflow with milk and honey, to burst with its fruits, and be smothered by its own riches. From St. Paul down the Mississippi, by the shores of Wisconsin and Iowa, by the ports on Lake Pepin, by La Crosse, from which one railway runs eastward, by Prairie du Chien, the terminus of a second, by Dunleith, Fulton, and Rock Island, from which three other lines run eastward, all through that wonderful State of Illinois—the farmer's glory—along the ports of the great lakes, through Michigan, Illinois, Ohio, and further Pennsylvania, up to Buffalo, the great gate of the Western Ceres, the loud cry was this—"How shall we rid ourselves of our corn and wheat?" The result has been the passage of 60,000,000 bushels of breadstuffs through that gate in one year! Let those who are susceptible of statistics ponder that. For those who are not, I can only give this advice: let them go to Buffalo in October and look for themselves.

Potabilization of Sea-water by the Electric Current.

In *Macmillan's Magazine* for last month is an interesting paper by Dr. Phipson, entitled, "Electricity at Work," in which the author passes in review the useful applications of this wonderful agency. He concludes his paper as follows:—"Reflecting upon the powerful decomposing chemical force with which we are furnished by the electric current, it occurred to me that I might be able to render sea-water potable by decomposing and extracting its salt, by means of a moderately powerful battery. The experiments were made at Ostend a few years ago. My apparatus consisted of three vessels containing sea-water to be operated upon, the two others communicated with the two poles of the battery. The three vessels were connected by two bent U-tubes filled with sea-water. As the only battery I could procure in Ostend was rather weak, I passed the current though the water for about fourteen hours, after which one of the outside vessels had become acid and the other alkaline. The sea-water was then filtered through charcoal, and was nearly drinkable. It would have been, I doubt not, quite potable had the battery employed been more powerful; as it was, I found it difficult to extract the last particles of salt, and the water, after subsequent trials, still presented a slightly brackish taste. I have not had an opportunity of repeating this experiment since, but from the results obtained, I think it probable that sea-water may be rendered potable by means of the electric current."

A Vermont Marble Quarry.

One of the best, though not the largest, of the marble quarries in Vermont is at Sunderland's Falls of Otter Creek, in the town of Rutland. One face of the quarry shows a perpendicular cut of perhaps 100 feet, and the other about half that, and that much below the level; the workmen still going deeper, as the quality of the marble is found to improve. Some of it is almost as fine as Italian statuary marble, and is taken out in blocks of about 100 cubic feet, perfectly solid and free from flaws or blemish. These blocks are cut out by a slow, tedious process of handiwork by men who labor at day wages—at present 90 cents a day. It is found better to pay day wages than job work, as great care is requisite, and all the work must be under the constant supervision of a competent overseer. Powder is only used to open a starting place in the floor of the quarry for a new course of blocks, and great care must be used so as not to injure any of the adjoining marble. The first course is worked out between a natural perpendicular seam, running nearly east and west across the ridge in which the quarry is situated, and the first cut, which is to form one face of the block. Another cut is made parallel about four feet from the first, and cross-cuts about six feet apart; holes are drilled under the bottom and wedges driven in to break up the block from the bed. It is then pried out of its bed and hoisted to the surface by ox power on the sweep of a windlass and a great crane. This process is continued quite across the floor of the quarry, until all that course of blocks are removed, the area lessening a few inches with each course, because the workmen cannot work quite up to the perpendicular side, so that every course that has been taken out shows on the nearly perpendicular face, and when wet, the exact color and dip of strata of each particular description is seen, and forms an interesting geological study.

Railroads in Michigan.

The Detroit *Commercial Advertiser* says:—We have now in actual operation, within the State of Michigan, upwards of one thousand miles of railway, all of which is owned by six companies, viz:—the Michigan Southern and Northern Indiana (having a total length, with branches, of 549 miles), the Michigan Central (284 miles), the Detroit and Milwaukee (188 miles), the Grand Trunk (Detroit branch 57 miles), the Flint and Pere Marquette (35 miles), and the Amboy, Lansing and Traverse Bay (30 miles), making a total of 1,143 miles now in working order. The trunk lines leaving the city of Detroit are, the Michigan Southern, Michigan Central, Detroit and Milwaukee, and Grand Trunk, all of which are doing excellently well. The Michigan Southern road has direct connections with Chicago, St. Louis, Milwaukee, Cincinnati, Toledo, Cleveland, Buffalo, Philadelphia, New York, Washington and Baltimore, besides its numerous branches diverging in all directions from its main line. At Buffalo and Dunkirk it affords a choice of routes to the eastern traveler, and along its whole line affords the most splendid scenery. The Central road is regarded as the great avenue of travel between Chicago and the East, *via* the Great Western and Grand Trunk Railways of Canada, and is a connecting link in the great chain of railways from Portland, Maine, to St. Louis, Missouri. The Detroit and Milwaukee road connects in this city with the Michigan Southern, Great Western, and Grand Trunk roads, forming the most direct route for Milwaukee and the great Northwest.

Substitute for Apple Sauce.

A lady writer communicates the following bit of information obtained where she "took tea last":—A dish of what I took to be preserves was passed to me, which upon tasting I was surprised to learn contained no fruit. The ease with which it was prepared and the trifling cost of its materials, not my tasting apparatus, deceived me as it is not usually wont to do. It is emphatically a tiptop substitute for apple sauce, apple butter, tomato preserves, &c. It is prepared as follows:—Moderately boil a pint of molasses from five to twenty minutes, according to its consistency, then add three eggs thoroughly beaten, hastily stirring them in; continue to boil a few minutes longer, and season with nutmeg or lemon.—*Oil Springs Chronicle.*

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AN AMERICAN SHIPBUILDER ON IRON-CLAD FRIGATES.

The editor of the Boston *Commercial Bulletin* states, in his introduction to Donald McKay's communication published in that paper, that it was written in Paris after its author had just completed a tour of the French and English navy yards. We condense some parts of that letter and give extracts from other portions of it. Mr. McKay states that for common peace service, the old kind of ships will probably be continued on foreign stations, but "for actual warfare their time is past." He begins with the French navy. In addition to ten iron-cased floating batteries, constructed during the Crimean war, the French have afloat two floating batteries of fourteen guns each, which have a speed of six and a-half knots per hour, and both of them are covered with 4½-inch iron plates. There are also four iron-cased frigates afloat, namely, the *La Gloire*, *Normandie*, *Invincible* and *Couronne*. They have each engines of 900-horse power, a speed of thirteen and a quarter knots per hour, are plated from stem to stern, from six feet below the water line to the upper deck with 4¾-inch plates, and they are armed with thirty-six rifled 30-pounders. Their length is 257 feet; width fifty-six feet. The steering house is an iron tower placed behind the main mast. These are all wooden vessels, but plated with iron, with the exception of the *Couronne*, which has an iron frame. Besides these sixteen iron-clad vessels of different sizes and characters, there are two armor-clad rams—the *Solferino* and *Magenta*—which have engines of 1,000 horse-power each, and carry fifty-two guns. They are wooden built vessels covered with armor. The ram is secured on the stem at about three feet below the load line; their decks are plated under the top plank with ⅜-inch iron; their speed is thirteen and a-half knots per hour. Eighteen armor vessels are therefore fit for service in the French navy.

On the stocks the French have two armor-clad batteries, which have engines of 150 horse power, and are intended to carry fourteen guns; also seven others which are intended for harbor defense. Besides these, there are ten large iron-cased frigates of the *La Gloire* class on the stocks. If required, they could all be completed and ready for sea by next autumn.

The English have four iron-cased frigates completed and in service, namely, the *Warrior*, *Black Prince*, *Defence* and *Resistance*. The two former are the most formidable armor-clad frigates afloat. Their engines are of 1,250 nominal horse power (6,000 actual) and they carry forty guns; the two latter have engines of 600 horse power, and carry eighteen guns —Armstrong 100-pounder rifled and 68-pounder smooth-bores. The speed of the *Warrior* at sea on her first cruise was twelve and a-half knots per hour; her trial speed 14.354 knots. The speed of the *Resistance* and her consort is 11.356 knots per hour.

The British are now building the following seventeen iron-clads. This list we take from *Mitchell's Steam Shipping Journal*:—

The *Prince Albert*, cupola ship, of twelve guns, 4,045 tuns, and 1,000-horse power; the *Minotaur*, fifty guns, 6,621 tuns, 1,250-horse power; the *Tamar*, troop-ship, three guns, 2,812 tuns, 500-horse power; the *Orontes*, of similar dimensions, and for similar service; the *Northumberland*, fifty guns, 6,621 tuns, 1,250-horse power; the *Valiant*, thirty-two guns, 4,063 tuns, 800-horse power; the *Caledonia*, thirty-two guns, 4,045 tuns, 800-horse power; the *Enterprise* and *Circassian*, sloops of 990 tuns and 160-horse power; the *Favourite*, corvette, 1,857 tuns, 400-horse power; the *Royal Oak*, fifty guns, 4,045 tuns, 800-horse power; the *Achilles*, fifty guns, 6,079 tuns, 1,250-horse power; the *Hector*, thirty-two guns, 4,063 tuns, 800-horse power; the *Ocean*, fifty guns, 5,045 tuns, 1,000-horse power; the *Prince Consort*, fifty guns, 4,045 tuns, 800-horse power; the *Zealous*, sixteen guns, 3,716 tuns, 800-horse power; and the *Agincourt*, 6,650 tuns, and 1,320-horse power.

With the four afloat, this comprises a list of twenty-three armor-clads. Four of these will be larger than the *Warrior*, and will be plated from stem to stern with 5½-inch plates. The *Hector* we learn has been launched at Glasgow since the above was published. She is 286 feet in length, and fifty-six feet in breadth. She is to be plated from stem to stern with 4½-inch plates. Her cost will be $875,000, at the rate of five dollars per pound sterling. The *Prince Albert* and *Royal Oak* have also been launched, and it is expected they will be finished this year. It is intended that their speed will not be less at sea than eleven and a-half knots per hour. We have thus presented the number of the French and English armor vessels that have been built or that are now being constructed.

In size and power the French fleet will be far inferior to that of Great Britain. Mr. McKay states that the opinions of practical men in Europe are unfavorable to shield or turret ships. A number of the frigates mentioned are being converted into iron-clads from first-class wooden line-of-battle ships. Besides all these vessels, Mr. McKay says:—

There are two other classes of ships building on plans of Mr. Reed, naval architect, who got a temporary appointment in the navy. The characteristics of these ships are that they are only plated a little above and below the load-line and the midship part of the vessel containing the guns. The object of the design is to relieve the ends of his vessels of weight, and so far his plans agree with those I proposed to our Navy Department eighteen months ago —but in vain. Here the plan has found great favor with the Admiralty, and a great number of thirty-six gun frigates are to be transformed into iron-cased sloops on this plan.

Omitting many details of description connected with these foreign vessels, we give the concluding and more important views of Mr. McKay, nearly in full, as follows:—

The French can have by the end of next year a fleet of sixteen iron-cased frigates fit for foreign service, and the English can muster in a year and a-half sixteen iron-cased frigates and two iron-cased corvettes, all fit foreign service and for an aggressive warfare.

If we compare with these immense fleets the iron-cased navy of the United States, impartially, we have to acknowledge that in case of a war with either of the above Powers, we would have to keep entirely on the defensive, to submit to a disgraceful blockade, and to leave our merchant ships all over the globe to the mercy of our enemy. All the *Monitors* which we are building by the dozen are very well to defend our harbors, but they are entirely unfit to break a blockade or to act on the high seas, for to say that these vessels are good sea-boats, or suitable for men to live in, is simply ridiculous, in which statement I will be upheld by all experienced sailors and ship-builders of any note.

With their very light draught of water these *Monitors* never can obtain a high degree of speed, and if ever they should fall in with any of the large frigates in deep water they will be terribly handled, and in all probability run down. Do not think that this could not be done because the *Merrimac* failed in her attempt to run down the *Monitor*. She struck with a speed of three or four knots or even not as much as that, but a mass of 6 to 9,000 tuns in weight, driven at a speed of twelve to fourteen knots would give a different result.

Of all the iron-cased ships which we have, the only one that might successfully cope with the large English frigates is the *Ironsides*, built in Philadelphia. She is well planned, and her practical construction very well executed, but her speed is too low to use the good points of the vessel to advantage, and the way of fastening her plates will not stand the test of a heavy cannonade, for in the experiments made in England with armor plates, similarly fastened by screw bolts screwed in from the inside, the bolts broke off short on the inside of the plate whenever a heavy shot struck the plate near such bolts.

It is satisfactory to know that Mr. Webb has got a contract for building an iron-cased ship according to his own plans. He certainly will produce something able to compete with any European frigate.

Now to be compelled to keep on the defensive (in itself a defeat) in case of a war with any of the great naval powers, it is absolutely necessary that we should have at least twenty large, powerful iron-cased frigates, that can be used also as rams, of at least twelve knots speed, capable to carry ten days' coal, and not exceeding a draught of water of twenty-four feet. With less draught it is impossible to impart to such large ships the above high speed.

Mr. McKay does not like iron ships; he prefers wooden ships simply covered with plates. On this head he says:—

They ought to be built of wood that they can be coppered, thus avoiding loss of speed on account of the fouling of the bottom. In case of these ships striking, a wooden bottom never is injured in a like manner as an iron one invariably is, and besides the wooden frame affords a much better backing to the armor plates than ever can be afforded in a ship built entirely of iron.

He mentions the case of the *Resistance*, the bottom of which was found covered with barnacles, after she had been lying at Portsmouth for a very short period. Mr. McKay asserts that far stronger wooden vessels can be built in America than Europe, because thick oak planking of from forty to sixty feet in length can be obtained in abundance in Delaware and Ohio, and no where else on the globe. He concludes his communication as follows:—

In addition to the above frigates, we ought to have at least twenty to thirty fast iron-cased shell-proof corvettes, of about ten to twelve heavy guns each, and of a moderate draught of water, with high speed.

With such a fleet we can uphold the honor of our flag, and meet any fleet that can be brought against us.

For the service in foreign countries, to protect the commerce of our own country and to harrass that of the enemy, we ought to have about twenty to thirty 50-gun frigates, not cased—and as many sloops, of fourteen to twenty-four guns, of the highest speed obtainable, so that they may be enabled to strike unexpected blows and to evade their iron-cased adversaries, which never will obtain the same high speed at sea as can be given to them.

In my opinion, wooden ships (uncased) will never be entirely done away with. The same opinion is fast gaining ground in Europe, and our own present war has offered us hundreds of examples how effectively wooden ships can be used in warfare, notwithstanding the destructive effects of modern artillery. No time should be lost by our Government in creating a powerful fleet, fit to cruise in all the seas of the globe.

With such quantities of the most superior iron in the world as Pennsylvania affords, with such facility, and pasture white oak, also superior in quality, dimension and durability, to that of any other nation, combining these with the highest talent which we undoubtedly possess, we should not close our labors until we have constructed the most powerful navy in the world. Then, and not till then, shall we be respected by all nations.

VALUABLE RECEIPTS.

Black Writing Ink.—Notwithstanding the great number of receipts for making ink which are to be found in various publications, it is a fact that very great quantities of the inks which are sold resemble black slush. After standing a few days they leave a deposit in the bottle as thick as molasses. In this and future numbers of the Scientific American we will give a series of receipts for making inks of various colors, and we commence with Ribancourt's French ink. It is prepared as follows:—Take Aleppo galls in coarse powder, 8 ounces; logwood chips, 4 ounces; sulphate of iron, 4 ounces; powdered gum arabic, 3 ounces; sulphate of copper, 1 ounce; crystallized sugar, 1 ounce. The galls and logwood are boiled together in one gallon of water until half of the water has been evaporated; the decoction is then strained through a hair sieve, and the other ingredients added and stirred until they are all dissolved. It is then allowed to rest for 24 hours, when it may be bottled up for future use. The editor of the London *Chemical News* states that the following receipt has been furnished by a correspondent who states that good writing fluid may be made as directed:—Triturate in a mortar 36 grains of gallic acid with 3½ ounces of a strong decoction of logwood, and put it into an 8-ounce bottle together with 1 ounce of ammonia. Dissolve 1 ounce of the sulphate of iron in half an ounce of warm water, then mix the solutions together by agitating them for a few minutes. It is stated that a clear ink may thus be formed which will keep a considerable length of time without becoming thick or growing moldy. It must not be mixed with any common ink.

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THE PROPORTIONS, FORM AND DIMENSIONS OF THE SEVERAL CLASSES OF WAR-SHIPS FOR MODERN SERVICE.

The following paper is taken from *The Engineer*. It was read by a member of the Scottish Shipbuilders' Association at one of its recent meetings, and it bears evidence of much research and a thorough acquaintance with the subject :—

Successful warfare under any circumstances depends upon the means of attack, skill and bravery included. Ancient armor was proof against arrows and spears, but succumbed to musket shot. Wooden vessels were defensible against the artillery of fifty years since, but are useless against modern shell. An inch plate of iron is impregnable to shell, and again we revert to solid shot. Defence attempts iron sides sufficiently strong to resist all artillery; and as body armor became useless for protection against the musket, so will the armor of modern war ships become useless as protection from improved artillery. The science of attack must, from the constitution of man, always have the best of the battle. Defence cannot build stone walls or iron ships strong enough to resist the ingenuity and power of attack with perseverance; the last resort is therefore flight, and the efficiency of armor-clad ships resolves itself finally into a question of invulnerability or speed. In all former naval wars of this country, the efficiency of the opposing fleets consisted chiefly in this quality of speed, in which all European maritime nations were our superiors; and, though courage and seamanship compensated for all deficiencies, much unnecessary trouble, anxiety, and loss resulted from an inferiority in sailing qualities, universally acknowledged, yet never remedied. It is to be hoped that no future naval war will find us in the same condition; and while the weakness of foreign nations may direct their attention principally to the means of defence and flight, it should be the principal aim of this country to develop the ingenuity of attack. Armor-clad ships must be met by armor, but only so far as it is imperative to keep out the shells. With sufficient armor for this purpose, the chief elements in attack are rapidity and strength : at the present day, on the sea, the first means coal, the second iron. No nation can now protect itself either way without these. We have the greatest command of coal and iron as yet, and, with the courage and skill to use them, British iron will serve our purpose as well as British oak has done.

The proportions of sailing vessels, naval and commercial, underwent no change for more than a hundred years before the introduction of steam as a propeller, and the whole question of steamship propulsion being still in a purely experimental condition, no difficulty need be felt in assuming any proportions to which the strength of materials for dimensions and strains is not absolutely insufficient. Length is the most obvious direction in which proportions may be varied. River steamers may be made of any length and lightness—the longer the better, provided their displacement will carry their weight; but sea-going vessels being subject to excessive variations of strains throughout their length, must be made sufficiently strong to sustain their whole load displacement in sudden variations, by the ends and by the middle; and as the strain in either case comes on the middle to break the vessel either up or down, the middle of every sea-going vessel should be sufficiently strong to sustain the weight of the extremities under any possible variation of the points of suspension. It is possible to prove, but the experience of iron merchant vessels renders it unnecessary, that iron vessels can be made sufficiently strong up to ten beams at least in length without impairing their efficiency as sea-going merchant vessels. What can be done, therefore, with merchant vessels it is possible to do with ships-of-war; but the question of efficiency in the latter case has quite a different meaning. Great speed may be obtained in very long merchant steamers, on light draught, by paddle wheels; but as far as modern naval engineering carries us, a ship-of-war must be a screw steamer, for the safety of the propelling power. In a screw steamer, therefore, the first consideration for high speed is sufficient area of propeller in proportion to the immersed surface and weight of the hull to be driven; in low velocities (say up to ten knots) with a low frictional co-efficient of resistance—and in very long vessels friction is the principal element of the resistance—it is possible to drive a vessel of ten beams long with a comparatively small propeller, without any apparent difficulty or diminution of the speed as compared with a vessel of six to eight beams long—power, propeller, immersed mid section, and lines of the extremities the same; but for high velocities a large area of propeller is indispensable; and as the immersion, and consequently the effective size of the propeller, does not increase in proportion to increased length, clearly there is a length attainable in proportion to immersion at which the screw in any form would be utterly inefficient for high velocities. In order to be able to form an estimate of the comparative efficiency of long and short screw steamers, and relying on experience as a much safer guide than theory, I will compare a few results of performance by vessels of different proportions, of which we have the satisfaction of knowing that they were all performed and tabulated under one direction, and were not undertaken to prove the superiority of long vessels in point of speed.

In the Admiralty tables of experiments, published in the *Artizan*, 1859-61, it will be seen that vessels under 1,000 tuns range from 5 to 6½ beams long, while, above that tunnage, even with all their adaptation as screw steamers, the length maintains the very short range from 3·3 to 5 beams; almost none of the line-of-battle ships exceed 4 beams, and only a very few of the 3,000-tun ships or frigates of the *Mersey* and *Orlando* class come within range of 6 beams, these same vessels being only 5¾ times their breadth. Experience will certainly bear us out in assuming that wooden ships of war of the largest class cannot be built sufficiently strong above certain proportions, say 6 to 1, to carry their machinery and armament; and apparently this proportion is considered by naval architects nearly sufficient for even iron ships of war. Vessels of war do not usually vary much in form or proportion, and, therefore, it is difficult to show a great contrast of efficiency; sometimes it may be done, however. Two striking instances are noted by the Admiralty in the tables referred to. The *Teazer* and the *Rifleman* are evidenced for the advantage of fining the lines aft, this advantage amounting to nearly equal speed with half the power.* We have also the advantage of fine lines forward in the case of the *Flying Fish*, which, by being lengthened 18 feet by the bow, equal to ·6 of a beam of increased length, steamed nearly one knot faster with the same indicated power. This vessel was 6⅔ beams long before being lengthened, yet the increase of length to 7¼ beams, notwithstanding the increase of surface and nearly 100 tuns displacement, had the result stated.

In no instance do the larger class of vessels of war bear a favorable comparison with the transports purchased from the merchant service, the particulars of which are given. The following were selected to show the greatest possible contrast of proportions, with the closest resemblance of the other terms.

Names of vessels.	Length to breadth.	Draught of water.	Area of mid section.	Displacement	Indicated horse power.	Speed.	Remarks.
Urgent.....	7·11	18·4½	513	2370	1226	11·996	Difference in favor of the *Urgent*, 1·98 knots, with 120-H.P. less than *Dauntless*.
Dauntless...	5·48	16·7	512	2350	1347	10·016	
Perseverance	7·08	18·0½	500·5	2299	912	11·297	Difference in favor of *Perseverance* 2·74 knots.
Termagant..	5·19	16·9	580 6	2370	907	8·554	
Transit.....	7·23	18	528·5	2628	1234	11·909	Difference in favor of *Transit*, 2·83 knots with 200-H. P. less, and 100 tuns less displacement.
Goliath.....	3·35	20·0½	684	2737	1437	9·16	
Himalaya..	7·38	20.1½	712	4273	1900	12·9	Three beams longer; carries more displacement at equal speed with little more than half the power.
Anson.....	4·42	20·2	856	4190	3582	12·984	
Immortalite	4.82	21·5½	717	3638	2392	12·538	600 tuns less displacement than the *Himalaya*; 500-H. P. more, same mid section, and less speed. Proof that fine mid section without fine ends will not give speed.
Orlando....	5·77	21·9½	876	5456	3992	13·16	

* There is evidently an error in the tables respecting these vessels, as it is difficult to see how they could be altered so much finer as to give nearly two knots additional speed with the same power, yet without affecting the displacement on the same draught of water. They must otherwise have been very full and round on the buttocks, similar to what the *Dwarf* experimental vessel was made, by piercing up her run to resemble some of the first screw vessels building in the dockyards, by which the speed was reduced from nine knots to four—a result which very properly led to a wholesale alteration of the vessels then in progress. Such an alteration might be made on the *Teazer* and the *Rifleman* without any material influence on the displacement.

The *Himalaya's* dimensions are 340·5 + 46·15. The *Orlando's* dimensions are 300 + 52; the depth is not given, but the draught of water and other particulars are according to the table. The *Mersey* is a similar vessel to the *Orlando*, and they are not considered so successful in performance as they were expected to be. One reason appears to be that they are too full for their dimensions, for high speed efficiency. The co-efficient of displacement calculated for extreme draught is ·562, while the co-efficient of the *Himalaya* is only ·472. In both cases the keel is included; but, deducting an average depth of keel, the *Himalaya's* co-efficient is exactly ·5, while the *Orlando's* is ·59. This is the true relative proportion of these vessels, and their efficiency corresponds, comparing the weight carried, power, and speed of the two vessels by the usual formulæ. It appears evident from these tables, that even with all other terms of comparison the same, speed increases nearly in the proportion of 1 knot per hour for each extra beam of length, the difference being equivalent, on 5 to 8 beams, to a saving of half the power with same speed, or to a fourth more speed with same power; a very much cheaper method of obtaining high speed performance than carrying a double load of machinery and coals.

Most of the ships of our present navy have been designed and constructed as sailing vessels, and afterward converted into steam vessels with screws. It would be probably unfair to expect that vessels lengthened in the middle, at the bow, and at the stern, to adapt them to an entirely different mode of propulsion, should preserve that degree of symmetry and adaptation which would be looked for in an original design, or that in performance they should exhibit as great a degree of efficiency, tried by the formulæ for speed, as vessels built purely for commercial purposes, of which speed may be the chief; but, assuming that speed is the principal element in a ship of war for modern service, the foregoing evidence is very much in favor of the length of a vessel in relation to her other dimensions and power being the principal condition for speed; and we may safely say that all the large vessels of our present fleet do not possess the proportions essential to perfection in performance. It may be that these vessels are no longer the war navy of this country—that the material of which they are built and the system on which they are armed and equipped is entirely superseded; but, if an iron armor-clad steam fleet be built on proportions of five and six beams in length, their efficiency as steam vessels will be no greater than the fleets they have superseded; and not being fully equipped as sailing vessels, their expense on foreign service would be enormously increased in using coal to make up for want of canvas. Again, if in service in fleets (and if it be true that the speed of a fleet must always be the speed of the slowest), if the minimum speed were raised to the maximum shown in the Government tables, which, by the contrast shown, it might very easily be, without any increase of expense for fuel, it is quite clear that a fleet with a minimum of thirteen knots would be a much more formidable enemy or serviceable friend in any case than a fleet with a minimum speed of nine knots at the same expenditure of fuel. If, therefore, the future fleet of Britain is to be a steam fleet, all considerations of equipment should give place to the efficiency of the hull and machinery for the required speed, and the arrangement of the armament designed to be carried. The dimensions of the several classes should in every case depend upon the weight of the vessel, machinery, armament, and stores combined; in other words, a certain fixed displacement, at a fixed load draught, should in each case be determined for the class and service intended.

By this means, with one determinate quantity, the proportions and dimensions being dependent on it and deducible from it, the most efficient form and dimensions for each class are, or would be, more easily deducible than the most efficient steam engine from any given indicated horse power. At present the old builders' tunnage regulates the proportions and dimensions of our ships of war, and vessels are supposed to be capable of carrying a certain amount of armament in proportion to their tunnage, nearly altogether irrespective of the capabilities of the form or displacement of the vessel, or only so far as the

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regulation, form, and proportions have determined the displacement, &c., as nearly as the experience of that design and dimensions usually give.

[To be Continued.]

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, October 23, 1862; Mr. Tillman in the chair.

IMPROVED COAL-OIL LAMP.

Dr. COBURN, of Newark, presented several improvements in lamps, some of which have been recently illustrated in the SCIENTIFIC AMERICAN. One improvement exhibited was a modification in the mode of interposing some slow conductor of heat between the burner and the collar of the lamp to prevent the heat from being conveyed into the oil. The speaker stated that the Hard Rubber Company had purchased several patents for different modifications of this plan, but he thought his was better than any of the others, for the reason especially that in his the screw is formed of metal, while in others it is formed directly on the rubber, and as the rubber is softened by the oil, the screw is very quickly destroyed.

INSTRUMENTS FOR TESTING THE EXPLOSIVENESS OF ROCK OILS.

Mr. GUISEPPE TAGLIABUE—The instrument on the table is one of mine, and I should be pleased to have Mr. Churchill explain its advantages. [This instrument was illustrated on page 184 of the current volume of the SCIENTIFIC AMERICAN.]

Mr. CHURCHILL—I have compared this instrument very carefully with all of the others in market designed for the same purpose; and I find that when properly used, its indications are reliable, while all of the others are worthless.

Mr. JOHN TAGLIABUE—I should like to know on what grounds all other instruments are pronounced worthless. I have an instrument which I consider the best in use. What is it that these instruments are designed to show? What is it that a purchaser of oil seeks to learn by their use? It is the temperature at which the particular oil to be tested throws off those inflammable vapors that, mingled with atmospheric air, form explosive compounds. If an oil parts with these vapors at ordinary temperatures, it cannot be stored or kept in the house without danger; but if it requires to be heated in order to part with them, it may be kept with no more risk than there is in keeping many other substances. We test any oil in this particular by holding a lighted taper over it, then gradually heating the oil, and when the vapor explodes observing the temperature of the oil by a thermometer. In order to heat the oil uniformly, we set the cup which contains it in a water bath, and we must take care not to heat it from other sources. If the flame by which the vapor is to be exploded communicates by means of metal with the oil, the oil will be heated by this flame. I therefore, interpose two pieces of clay to prevent the heat from being conducted from the flame to the oil. In order to heat the oil evenly in all parts I keep the surface of the oil exactly at the same level as the surface of the water in the bath. Then I keep the flame always at the same hight above the surface of the oil, for I find that a variation of the sixteenth of an inch in this hight, will make a difference of several degrees in the result. I insert a thermometer in the oil; and my instrument is nearly the same as this, excepting that I dispense with the cover and closed chamber above, and my lighting flame is stationary, while in this a taper is applied from time to time as the temperature rises. I should like the gentleman to point out why my instrument will not give as reliable tests as this.

Mr. CHURCHILL—I have examined all of these instruments with great labor and care, and I am satisfied that it is necessary to cover the oil cup, and catch the vapors in a close chamber. If the cup is not covered, the least current of air blows the vapors away. It is surprising how little movement of air will entirely destroy the operation of the instrument; and unless the vapor is confined in actual contact with the flame, it frequently will not ignite. In the burner which has a number of radiating jets, I have tried the experiment of extinguishing one jet, and I have seen the gas continue to issue between the two adjacent flames for forty seconds before it took fire. I have also repeatedly seen the gas burst out from the side of a flame, and blow off without burning for some time. It seems to be the property of these vapors to mingle with the air with great reluctance. I have no doubt that the difficulty of burning petroleum without a chimney is principally owing to the fact that some portion of the vapor escapes unconsumed, and thus carries its disagreeable odor into the room. From this property of the vapors, I think the close chamber indispensable. I believe there are also fatal objections to the fixed taper. It aids in heating the oil in some portions of the cup, and may thus raise explosive vapors at temperatures which will not be indicated by the thermometer.

Mr. STETSON—Through what range of temperature have you found the rock oils in the market to form the explosive vapors?

Mr. CHURCHILL—From 90° to 134° Fah.

Mr. GUISEPPE TAGLIABUE—I have no disposition to find fault with my nephew's instrument, but I think the cover and close chamber are necessary. There are 500 barrels of petroleum now in the market which cannot be sold in consequence of the oil forming explosive vapors at too low a temperature.

IMPROVEMENT IN ELECTROTYPING.

Mr. KNIGHT—I have here in my hand a wax mold ready to receive a copper deposit to print a page of a newspaper. This mold was formed by pressing a form of type into the wax by a powerful hydraulic press. As wax is a non-conductor of electricity, it is necessary to dust the surface with some conducting substance before it is placed in the bath, and plumbago is used for the purpose. We usually connect the battery with the metal rim that surrounds the mold, and we find that the deposit commences at the rim and gradually grows over the surface, taking two, three or more hours to form a complete coat. In plating on metal surfaces, the deposit does not grow in this manner but spreads at once and evenly over the whole surface. Now I will exhibit a plan by which I coat the wax mold at once with a thin sheet of copper, so that the deposit may proceed evenly, and the long delay resulting from the slow extension of the deposit may be avoided. I lay the mold with its face up in this shallow box, and pour over it a solution of sulphate of copper. I then from this dredging box shake over the surface a dusting of iron filings; distributing them evenly with this soft paint-brush. I now raise one end of the mold and pour on a current of water from this pitcher to wash off the excess of iron, and you see the mold is completely coated with a thin sheet of copper. It is now ready to be placed in the bath, and the rest of the shell will be deposited evenly by the battery. By this improvement in the process, the time of forming a shell is reduced from 5 or 6 hours to 30 minutes.

The CHAIRMAN—This formula indicates the changes, $Cu.\ S.\ O._4 + Fe. = Cu. + Fe.\ S.\ O_4$. The sulphuric acid leaves the copper and combines with the iron.

Mr. GOODMAN—You ought to put one of the O's with the copper, and with the iron.

The CHAIRMAN—Yes, I know, by the old theory. But this is the empirical formula and it is a great deal simpler than the rational formula. You see that the elements are all the same.

NEW LACTOMETER.

Prof. SEELY—I hold in my hand a lactometer which I have designed and tested. The nourishing parts of milk are the butter and the cheese or casein; and as the proportion of these two to each other is pretty constant, if we measure the quantity of butter, we ascertain the value of the milk. As the petroleum oils dissolve all fats, I have designed this instrument for dissolving the butter out of the milk by means of benzole, and measuring the reduction in the volume. It consists you see of two glass bulbs connected by a hollow cylindrical stem. I fill the lower bulb and the stem with milk, letting the milk rise in the stem to the zero mark. I then pour a quantity of benzole into the upper bulb, when, by inverting the instrument, the milk and the benzole are mingled together. I shake the mixture so as to bring all portions of the butter into contact with the benzole, and then re-invert the instrument. The benzole, being of less specific gravity than the milk, rises to the surface; carrying with it the dissolved butter, and the extent to which the surface of the milk descends in the cylindrical neck indicates the quantity of butter extracted. As good milk contains about 4 per cent of butter, if I find that but 2 per cent is taken out, I conclude that the milk has been watered one half. I have tried some milk in this instrument from the same sample of some that I recently analyzed, and I find that its indications correspond very closely with the results of my analysis. If it works as well as it promises, it will effect in ten minutes what cost me four days to accomplish.

Mr. SMITH—There is one difficulty with this lactometer and with all others. Pure milk as it is drawn from the cow varies so much in quality that ascertaining the quality, by whatever means, is no test of the purity.

Mr. FISHER—As it is the quality which interests us, and not the purity, this would seem to be no objection to a good lactometer.

PAPER AND ITS MANUFACTURE.

Mr. SMITH—I introduced this subject, with a view not of imparting information, but of obtaining it. I will, however, make a few remarks to open the subject. Paper is made of vegetable fiber, and it seems that almost any vegetable fiber answers the purpose. The first step, and one that costs a good portion of the labor, is to get the fibers separated. To effect this the material is ground in mills, and macerated in water; reducing it to a fine pulp. It is then formed in sheets by different processes, two of which are principally employed in this country. One of these is the Fourdrinier, which was invented in France and perfected in London. In this an endless web of wire cloth is run through the vat of pulp; picking up the pulp and carrying it off in a sheet, which is pressed between rollers, and then dried. The other is called the cylinder process. In this the pulp is formed on a perforated hollow cylinder from which the air is exhausted, so that the pressure of air upon the outside against the perforated cylinder holds the sheet of pulp upon the surface.

Mr. STETSON—What is it that holds the vegetable fibers together so as to form a sheet of paper? If we soak rags in water for any length of time, and then press them ever so perfectly together, they do not form paper. It seems to be necessary to separate the material into its ultimate fibers, so that these may interlock with each other, something like felting.

Dr. STEVENS—In these days when every thing is made of paper, from our money to our shoes, there can be no more interesting subject than this. It used to be said "There is nothing like leather," but now there is nothing like paper. The paper manufacture has arrived at a degree of perfection which surpasses that of any other manufacture. The rags are thrown into a mill and torn to pieces, they are macerated in water, bleached and formed into paper, all cut into sheets of any desired size, each sheet trimmed upon its four edges, and the whole process occupies but one day. The rags may be sent from this city on one day and the paper received on the next. All of the trimmings are thrown again into the vat so that there is no waste. Neither is there any waste of heat. The steam that drives the engine is enticed back into the building, led through the rollers for drying the pulp, and conducted through tortuous channels, performing a multitude of offices, till all of its heat is extracted from it, when it is allowed to escape into the chimney. This may all be seen in the State of New Jersey, within 12 miles of this city, by any one who is not a paper maker; paper makers are not allowed to enter the works.

Mr. FISHER—I think, Mr. Chairman, that our paper dealers are behind our paper makers. I have had occasion to want paper in rolls, and I could not find it in market. I think if our dealers would keep it in this form, they would find considerable demand for it. It would be useful for many purposes.

The CHAIRMAN—We have heard a good deal about using wood for making paper; can any one tell why it has never succeeded?

Mr. STETSON—It costs too much to prepare the fiber.

Mr. DIBBEN—That is exactly the answer. If we had some process of separating the fibers cheap enough we could make good paper from bass wood. Besides the processes, Mr. Chairman, described here this evening, there is a process in use in a great many places in this country, in a great many more in Europe,

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and in millions in China, which is called the hand process. The pulp is spread upon a fine wire sieve, and the sieve is turned over upon a piece of felt. A second piece of felt is laid upon this, and then another layer of pulp is deposited upon it. In this way a pile of alternate layers of felt and pulp is formed, and it is then placed under a press and the water is pressed out of it. It is then spread upon grass and dried in the sun. When first laid upon the felt, the layers of pulp are half as thick as my finger, but under the press they are brought down to the desired thickness of board. I had a lot of board made in this way. I wanted it stronger than common. In the cylinder process the fibers are drawn partly parallel, and consequently the board is not as strong as when the fibers cross in all directions. Better paper is made in this way than by machines, and at not greatly increased expense.

The same subject was chosen to be continued for the next week, and the Association adjourned.

A FLORAL PATENT.

There has been standing upon the sill of our office-window, for the past two or three months, one of Chamberlain's moss-baskets, containing a peach tree of the dwarf kind. We have witnessed the gradual ripening of the green fruit into large and luscious peaches; the buds for the next season have become well set, and a fine growth of new wood has been made. Seldom have we seen a more thrifty specimen of the dwarf peach; and this growing in an open wire basket lined with moss without earth.

To give a rough idea of the manner in which the growing of plants in these baskets is managed, we may state that within the wire frame, hidden by the moss, is a small partitioned basin, forming a receptacle for the roots of the plant and also for a preparation, either a liquid or a powder, from which the roots derive nutriment.

We are assured that the growing of small fruit trees, vines, plants and flowers in this manner, is not a subject of recent experiment, but has been practically carried on by the inventor for the past seven or eight years. The ladies will find in it a very desirable improvement over the heavy flower-pots loaded with earth, to which they have heretofore been limited. These baskets are comparatively light in weight; each may contain several different varieties of flowers; they may be hung in the most favorable places in the green-house or dwelling for growth, and when in bloom can be readily removed to grace the dining-table or the drawing-room. They are in fact, living bouquets. At a recent exhibition of the Brooklyn Horticultural Society the collection of these baskets formed quite a feature of the occasion. There were grape vines, pear trees, camelias, roses, lilies, aralias, fuschias and all sorts of pretty flowers growing together in tropical luxuriance, but hung up on hooks and apparently living in the air.

By reference to page 343, Vol. V, (new series) Scientific American, our readers will see an engraving of the invention. We call renewed attention to it at this time because the inventor, Mr. A. C. Chamberlain has lately come among us to settle. He is an experienced gardener; his residence and green-house are at the corner of Ryerson street and De Kalb avenue, Brooklyn, N. Y.

WHAT ARE PAPER CONSUMERS TO DO?

Owing to the scarcity of rags for paper stock, and the high rate of foreign exchange, together with the scarcity of water to operate paper mills, the price of paper has advanced 25 per cent within ten days. What paper consumers are to do is now a serious matter for the consideration of publishers. If there is any substitute for rags, which is destined to take the place of them in the making of paper stock; now is the time to bring the article forth.

Explosion of a Locomotive.—The boiler of a locomotive exploded in Jersey City on the 25th inst. It was a disastrous accident as the engineer, fireman and three other persons were killed. The coroner's jury has brought in a verdict that the deaths of the deceased persons were caused by the explosion through the fault of the engineer. The gage, before the explosion, showed a pressure of steam much higher than the boiler was capable of bearing safely.

Correspondence

Pensacola and the Navy Yard.

Messrs. Editors:—We came here yesterday for coal, having been relieved temporarily off Mobile by the *Brooklyn*. As the Admiral is here, the question will probably be decided whether we are to remain in the Gulf during the remainder of the winter or not. The *Susquehannah's* engines have broken down, which decreases our chances of getting home for repairs quite considerably. General Butler came over last night from New Orleans to visit the Admiral, and was received with a salute.

I have this afternoon visited the Pensacola Navy Yard, or rather its ruins. The rebels did their destructive work well before they allowed this place to return to our hands. But a single one of the splendid buildings in the navy yard enclosure was left standing. That one, for a wonder, was the chapel. The yard has been a much finer one than that at Brooklyn, occupying a larger extent of ground. Its long, shady avenues, nicely paved and flanked by the usual extensive buildings, must have been very pretty and inviting. The avenues and walks have been cleared of rubbish by order of Admiral Farragut, and even the holes plowed in them by Fort Pickens' shells have been temporarily filled. The fine shade trees still remain, so that the yard now is a place for a pleasant stroll. The large gun park is uninjured, and, though the guns are removed, the accumulated piles of 32-pounder shot still remain as in times of peace, except where one shows the effect of the bombardment. As we pass along the avenues, the ruined blackened walls of building after building greet our gaze, and whichever way we go the sight is the same. Even the immense cisterns built above ground at such great expense—and beautiful specimens of architecture they are—are rendered worthless by the caving-in of their roofs, thus filling them up with rubbish. The quick-growing foliage of this climate has thus soon given the ruins an ancient appearance, by partially covering them and making the scene look more like nature. It makes one feel very unpleasant to look at so much desolation. The portions of the walls still standing show the marks of the severe bombardments that Pickens thrice inflicted, but no traces of machinery are left. Even all movable parts of the hydraulic pump, used to haul up ships, were destroyed or carried off. The "shears" or frames used in hoisting heavy weights still remain on the wharf, but they are bored by the treacherous foe, and the holes nicely plugged up, so that if we unsuspecting Yankees undertake to use them, they will send their whole weight down upon our heads. The officers' dwellings were very fine, and their destruction was disgraceful. Many marks of taste are yet visible about the ruined buildings, formerly the homes of the commissioned officers of the yard. The front door-yards were neatly laid off in flower plots. They also evidently had beautiful gardens in the rear, now in a very neglected condition. In strange contrast with former times were the pieces of shell lying on the grass, with here and there in the gardens a great hole plowed out by their explosion. I easily picked a bouquet along the northern avenue, on which the dwellings faced. I send a few flowers plucked from the neglected yards and put inside my diary hastily, without noticing or hardly knowing what they were. Perhaps, though faded, you can imagine them showing their heads in all their true beauty above the grass and weeds, in the neglected yards of buildings in ruins—the granite and brown-stone fronts in many cases still standing to show what they once have been.

I visited Woolsey, a little village just north of the yard, which was partially burned a year ago by the shells of Fort Pickens, when the *Richmond* was engaging Fort McRae. The houses are mostly small wooden structures, and were formerly occupied by the employees of the yard. The place was deserted till Admiral Farragut commenced a few weeks ago to clear up the yard. A few families have now returned from their retreats in the woods near the city of Pensacola, and others are coming. We got into conversation with an old washwoman that had returned in this way. She told us many things about the brutality of the rebel soldiers—how they spoiled the houses of the poor inhabitants, carrying off part of the doors and windows to make winter quarters, and smashing the rest for no reason whatever. When the navy yard was in flames, Fort Pickens opened a fierce bombardment to prevent the rebels from fully destroying everything. Woolsey was within range and the inhabitants fled, some taking nothing with them, so great was their fright. The rebel soldiers plundered the houses at such a time as this! The old woman says she told her daughter and son-in-law to go outside the village, and she went and took their few things out to them, saying that it was no matter if she (old as she was) was killed. One shell struck within 20 feet of her, she says, but did not explode. She had had so many troubles that she did not care much what did happen to her. She was evidently "grit" in the highest extent. * * *

Pensacola Navy Yard, Oct. 9, 1862.

Steam Cylinders.

Messrs. Editors:—Will you be kind enough to state in your column of "Notes and Queries" whether any of the ocean steamers have cylinders as large as 100 inches in diameter and 12 feet stroke, or are there many more than two or three larger than that in the world? One of the above dimensions is to be put up here for the use of the Water Works, and the statement has been made that there are only two or three larger ones erected. I think some (how many I do not know) of the ocean steamers have as large, and would be obliged to you if you would correct me if wrong. A. S.

Cincinnati, Oct. 22, 1862.

[Our correspondent is correct in his surmises. There are many engines in the world whose cylinders have a larger diameter than the one he speaks of. In this vicinity have been made four whose cylinders were 105 inches diameter and 12 feet stroke. The *Persia* has cylinders of 102 inches diameter, as has also the *Adriatic;* the last vessel was built by George Steers. In London there is a pumping engine of 112 inches diameter of cylinder, and the last and largest known to us, is the one by which the Haarlem Lake in Holland was drained; this engine has two steam cylinders, one within the other, whose diameters are respectively 144 inches and 84 inches. This monstrous machine drives eleven pumps of 63 inches diameter each. The engine is, we believe, now in active operation.

Clearness of the Waters of Lake Superior.

Messrs. Editors:—In August last, during a calm on Lake Superior, I took the opportunity to test the transparency and purity of its water, and thinking it might be of some general interest, give the result. A piece of white canvas one foot square was attached to the lead and lowered down into the water. After reaching a depth of 82 feet below the surface the canvas disappeared; it was clearly to be seen at the depth of seventy-five feet, but below that it faded from sight rapidly.

At the time the experiment was tried, the sun was only about 30° above the south-western horizon; had it been directly over-head it would have no doubt considerably increased the visible depth

F. A. Morley.

Sodus Point, N. Y., Oct. 15, 1862.

A Rat Exterminator.

Messrs. Editors:—Having seen in the Scientific American of this week an inquiry as to an exterminator of rats, I send you the following electuary; it having been given to me by those who have used it and found it excellent:—Take equal parts of powdered nux vomica and oatmeal and mix them thoroughly together and put the mixture a short distance from the holes. J. L. L.

Boston, Oct. 25, 1862.

[It is very easy to poison rats, but this is very objectionable in dwelling-houses, as the stench from their decaying bodies is worse than the living pest. What is wanted is some remedy that will effectually clear them from the premises.

Fresh Water Manufacture.

Messrs. Editors:—In your column of "Miscellaneous Summary" (page 259, No. 17), under the head of "Manufacturing Fresh Water at Fort

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Pulaski;" you state that Mr. Frederick Gilmore, of Paterson, N. J., constructed a condenser inside the fort, for supplying the troops engaged and stationed there with potable water. Will you have the kindness to say, that "when the need of water was felt" in the fort, the condenser in question was ordered from me by the War Department, and was constructed, erected and put in operation by me.

W. A. LIGHTHALL.

No. 5 Bowling Green, New York.

Steam Boilers.

MESSRS. EDITORS:—I take the opportunity to inquire through your paper which is the cheapest to use, a flue or a cylinder boiler? I have often heard it said that if you have plenty of room for cylinder boilers, they were more economical than flues. Is not a cylinder boiler considered safer than a flue? Can you give an idea of the ice manufacturing process in warm climates? G. U.

South Danvers, Mass., Oct. 23, 1862.

[With proper attendance, firing, and attention to the feed, flue boilers are the most economical; the saving of fuel in a boiler is always in proportion to the amount of its heating surface; a boiler 10 feet long, and 24 inches diameter may burn twice as much coal or wood, as one of larger dimensions; the object of flues, as our correspondent is doubtless aware, is to form a large amount of heating surface, to which small areas of water are exposed. In cylinder boilers generally, there are but two large flues running the whole length, in most cases none at all, and these are surrounded, when properly set, by fire and the heat from the same, on all sides as high as the water line. In order therefore, to form a proper estimate of the relative economy of the two systems, it would be necessary to have two boilers whose area of fire and water surface were the same, and compare their performances. The difference would be largely in favor of the tubular one, for the reason that the surfaces are not distant from the fuel but close to them, and also from the greater proportionate areas acted upon by the heat. These opinions are based upon the supposition that the price of fuel remains the same in both cases. The question of the relative strength of the two plans is immediately in favor of the cylinder, as that is the best shape for resistance of any kind; tubular boilers can be made just as safe, in point of strength, as they are required to be. For a description of the process of making ice artificially we refer you to Vol. V. No. 5, page 72, (new series) of the SCIENTIFIC AMERICAN.

Revolving Turrets—An Old Invention.

As considerable controversy has arisen as to who was the original inventor of revolving gun turrets, the following extract taken from the New York *Evening Post*, June 1843, will throw some light on the subject:—

On the corner of Greenwich and Liberty streets there is a model of a battery, which is of a novel and destructive character. It is erected in a circular form, and presents four tiers of guns. The plan of the battery is, indeed, similar to any other of that form. The important difference consists in the manner by which its armament is brought to bear upon an object. For this purpose it is made to revolve upon its center, and if this revolution is performed in one minute and the armament comprises a hundred guns, each one of them may in that period of time be discharged at the object. In no other way can so great a number of guns be brought to bear upon an object in so short a time. It is designed to put this in practice by erecting a circular fort of 50 or 100 feet in diameter, of plates of wrought iron. By means of steam power under ground, which shall cause it to revolve on its center, all the guns of this fort will be brought to bear at each revolution on a given object. The practicability of the plan remains to be tested, and the most important point would be to produce easy, uniform and rapid revolutions of so large a mass; though it would be smaller and less frail than some structures moved by mechanics at the present day.

[The above was sent to us by Mr. Fred. A. Hawley, of Windsor, Vt., who states he cut it from a Boston paper published June 1843, accredited to the *Evening Post* of this city.—EDS.

The above article appeared in our issue of Oct. 25, 1862, and annexed is a reply to it, handed in for publication a few days ago:—

The revolving turret, described above, was one invented and made by Mr. T. R. Timby, and since patented by him and exhibited by the undersigned at the time and place stated in the foregoing article, I also exhibited this model of Mr. Timby's to President Tyler and his Cabinet, some time in the month of June of 1843, at the City Hall in New York. This invention was very universally discussed by the press at that time. H. A. CHASE.

National Hotel, New York, Oct. 27, 1862.

BRIEF EXTRACTS FROM LETTERS.

It is an old adage that "straws show which way the wind blows," and so a single paragraph in a long letter often indicates all the writer has to say. We make a few brief extracts from letters recently received at this office, merely as samples of scores of others which are sent to us every week by our correspondents.

Mr. H. H. Christie, of Perch River, N. Y., in sending the $20 to pay the second Government fee for a valuable invention he has just secured through this office, writes as follows:—

As this will probably be my last communication to you concerning this business, permit me to thank you for your honorable dealing, and the promptness with which you have attended to my case and answered all letters of inquiry. I shall take pleasure in recommending your firm to any one who may have business at the Patent Office.

D. Harper, of Crystal Lake, Ill., writes as follows:—

I have received your letter informing me that my application for a patent on an improved plow had been allowed. You will please accept my thanks for the successful exertions you have made in my favor. You may rest assured that I shall always feel a pride and pleasure in recommending your Agency to all those having business with the Patent Office.

H. N. Gallagher, of Geneva, N. Y., writes as follows:—

I have to inform you that I received my Letters Patent two or three days ago. I am much pleased with the manner your Agency conducted my business. I shall always look to you for help when needed.

O. Sherwood, Jr., of Dunham, C. E., sends $20 to pay the balance of Government fee, and adds:—

You have my sincere thanks for the promptness you have manifested in procuring my patent. I shall cheerfully recommend your Agency and paper, as I ever have done since you first did business for me.

Charles G. Austin, of Nantucket, Mass., has got out a very handsomely printed circular, advertising his most excellent Patent Coal-sifter, and at the end of his advertisement he adds the following as a guarantee to the public that his invention is properly protected by the claims allowed, and at the same time, he gives a passing compliment to his agents:—

The patent for this invention was obtained through the Agency of Messrs. MUNN & Co., Patent Solicitors and publishers of the SCIENTIFIC AMERICAN, at No. 37 Park Row, New York City. I make this statement for the benefit of inventors, and all persons having patent business; and they may rely upon Messrs. MUNN & Co., as being honorable and trustworthy men, and thoroughly posted in all matters appertaining to patents.

The annexed complimentary notice we find in the Rahway (N. J.) *Register and Times*, of October 23d. We do not know that the editor who penned the paragraph is a patentee, but we feel assured that he has more than ordinary taste for the mechanic arts, and if the writer never took a patent in his own name, some friend of his has, and he took special interest in the manner his business was conducted before the Patent Office:—

Probably no similar concern in the world has been so rapidly and triumphantly successful in the highly important and most responsible business of securing Patents to Inventors, as the widely-known firm of MUNN & Co., 37 Park Row, New York. It only requires the most cursory inside view of their establishment to become satisfied that they have matured a system of transacting the momentous matters confided to their charge in the most conscientious and thorough manner conceivable; nor can we wonder, therefore, that their persevering and systematized efforts have, from the beginning, commanded success. As a matter of course, the spirit of science pervades almost universally the business in which they are engaged, and it is to this circumstance, in great part, that we must ascribe the numerous and unparalleled triumphs they have achieved in the glorious cause of mechanical invention. Let no man, therefore, of truly inventive genius, so far mistake his own interest and that of science as to forego the great advantage of consulting the above firm in any matter where the early procuring of a Patent Right is concerned.

THE Annual Convention of Steamboat Inspectors was held in Philadelphia last week. We expect to be able to obtain an abstract of their transactions for our next issue.

Hysterical Fits—A Mania.

A late Manchester (England) paper contains the following:—

Upward of three hundred girls were employed in sewing in the large schoolroom under Dr. Munro's Chapel, and one or two of them were subject to fits. One afternoon recently everything was proceeding in the usual manner, when suddenly one of the girls was prostrated by a fit. There was considerable alarm created in the school by this circumstance, and almost instantly another girl was attacked by what the superintendent believes was hysteria, and then another and another, until quite a panic prevailed; altogether nineteen girls becoming affected in less than an hour.

This hysterical mania is the effect of sympathy. A case of a similar nature occurred many years ago in a German orphan asylum. One of the children in it became subject to fits, and one after another of those in the Institution became as subject to the malady as the one that was first affected. The singularity of this case was soon noised through Europe, and the celebrated Dr. Boerhaave being then living, he was sent for, to see if he could prescribe a remedy for the affection. By inquiry and by observation he found that the fits came on at a regular period daily, and that when one of the children exhibited symptoms the whole number in turn became also affected. Boerhaave soon devised an effectual mode of treatment. He ordered a large fire to be kindled in the hall where the children were assembled, and he heated two pokers red hot. The children looked on in wonder, when just about five minutes before the time when the fits usually commenced, he lifted a poker from the fire and standing before the children declared in a solemn voice that the first one that took a fit should be burned in the face. As one poker cooled another was handed to the philosopher physician for the space of half an hour, when not a fit occurred on that day. On the day following the same scene was repeated and with like results, and in this manner in two days these fits were banished forever from that Institution. Fear frightened away the fit sympathy.

YANKEE INGENUITY.—A Washington correspondent writes as follows:—

Peddlers of newspapers, pies, cakes, and small wares drive a thriving trade among the soldiers near Washington. Near Fort Richardson a party of men have taken possession of an orchard and cider press, and sell great quantities of the liquor they manufacture to the soldiers. An enterprising firm have started a bone-boiling establishment on the river bank, and are making money by producing a fertilizer from the cast-off bones of the camps. Carts permeate through all the roads and by-paths collecting grease, which is sold to the soap and candle makers.

SCIENTIFIC AMERICAN.—We are in regular weekly receipt of this excellent publication. Messrs. MUNN & Co., the publishers, have been of incalculable benefit to the inventors of the United States. They have built up an immense business in the Patent Agency.

[We cut the above favorable notice from the *Rocky Mountain News*, of Denver City, C. T.; and if the appearance of the paper typifies the degree of civilization to which that city has attained, it must be a highly favorable place to locate in.—EDS.

THE LAST OF THE WEBSTERS.—Colonel Fletcher Webster, who was killed in one of the recent battles near Centreville, was the oldest son of Daniel Webster. His younger son was in the army in Mexico, and died in the service there. His daughter, Mrs. Appleton, died some years ago—so that now there is none left of the blood of the "Websters."

A RAILROAD ARGUMENT.—The *Territorial Enterprise* says the best estimates put the amount of freight required for Washoe and its dependencies, during the eight winter months, at 28,000,000 lbs. At 4½ cents per pound the freight on this would amount to $1,260,000. This is a forcible argument in favor of a railway across the mountains.

AN editor who has "gone for a soldier" publishes a portrait of his successor, a goodly pair of scissors. Well, Scissors is one of the best editors, and many papers would be greatly improved by a proper use of the same.

LEFT-HANDED COMPLIMENT.—When Mr. Whiteside finished his five hours' oration on Kars, Lord Palmerston replied that the honorable gentleman's speech was highly creditable to his physical powers.

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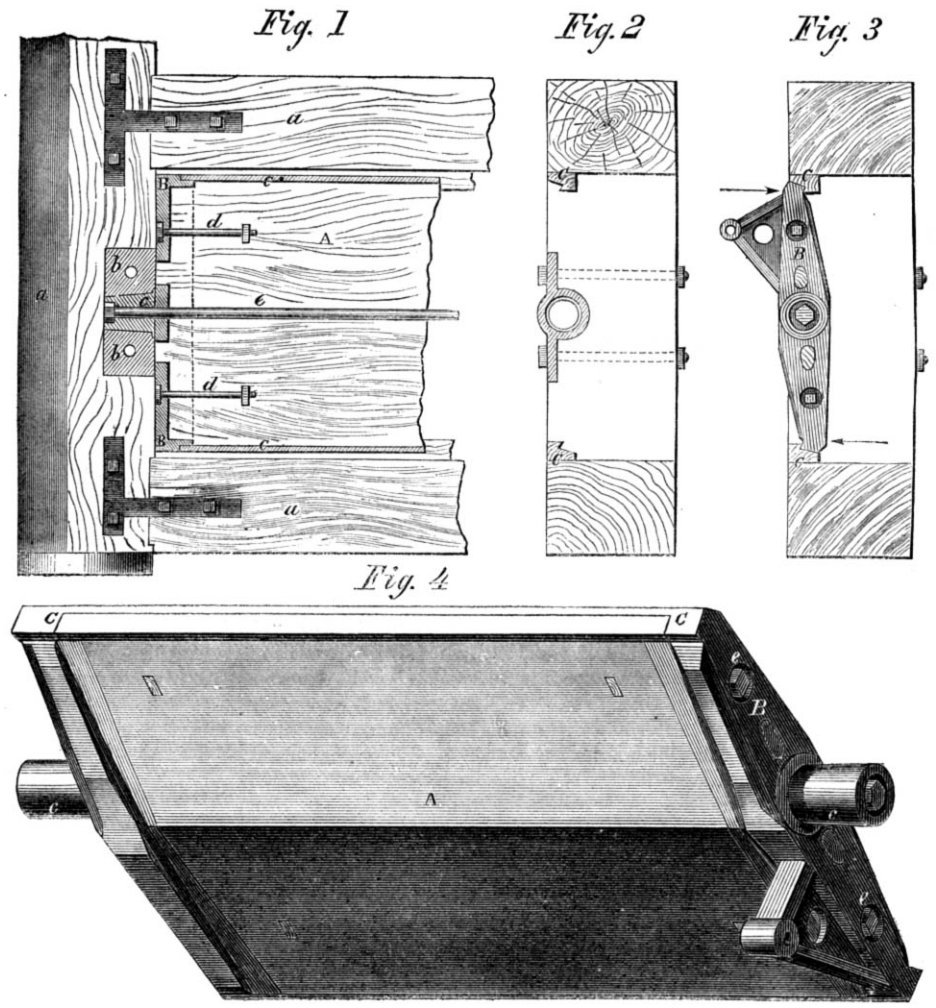
Improved Patent Valve for Canal Locks.

This invention, which the plans, sections, and projections accompanying fully explain, is intended for canal locks, admitting the water by which the boats are transferred from one level to another. It is hung in a rectangular wooden frame, which is represented as broken off in the cut for convenience, upon journals which pass through boxes provided for their reception, let into the frame before mentioned. The body of the valve is of wood, confined in a frame of iron, for such the various heads and seats composing the invention form; the distinguishing feature of the valve is the arrangement of the bearing edges or seats, which are struck from the center of the valve by bevelling, through which device the areas of the valve are rendered unequal, while the weight of it upon the journal is the same on both sides, the upper and lower edges of the seat remaining parallel; this method of construction gives a greater surface upon the pressure side, indicated by the arrows, and as a consequence it is opened more easily. Fig. 1 is a plan of the valve in section; in it A represents the wooden portion, B the iron heads which traverse the ends, and C the iron edges or seat; upon the rectangular frame, *a*, are the bearings, *b*, which support the whole apparatus, and contain the journals, *c*. The heads, B, spoken of previously, are secured to the valve by the screw bolts, *d*, and also by the shaft, *e*, which passes entirely through from end to end of the journals; the T-shaped irons in the frame being merely fastenings. Fig. 2 is an end section of the frame and its fittings, and shows the rebated cleats, C, which form the valve seat; the relations of the cleats and edges of the valve being so analogous that they have similar letter of reference. Fig. 3 shows the valve in place and the direction of pressure by the arrows; the projecting elbow being the part to which the operating rod is attached for opening and closing. Fig. 4 represents a perspective view of the valve and all its attachments, except the rod spoken of, the same letters referring to like parts; A being the wooden body, B the iron heads which confine the same, *e* the screw bolts which hold the heads in their places, and C the iron edges or seats of the valve which make the water-tight bearing against the rebated cleats, C, bolted on to the rectangular frame in which the valve is suspended, the small mortise holes in the body being made for the insertion of the nuts which screw on the bolts, *e*. In the end of the journal will also be seen the end of the shaft which was mentioned as running through and through. By means of the device of the beveled edges, therefore, and the greater area obtained through them, the inventor claims greater convenience and ease of operation, and by the employment of the wooden body with the iron attachments, strength and lightness are secured. Mr. George Heath, of Little Falls, Herkimer county, N. Y., is the inventor, to whom the right was secured, through the Agency of the Scientific American, on July 1, 1862.



HEATH'S PATENT VALVE FOR CANAL LOCKS.

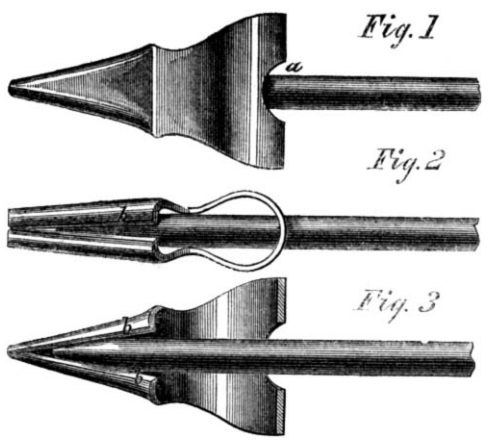
Seven thousand men are now busy in completing the iron-clads in and around New York city. In addition to these, ten first-class foundries have all their men engaged upon the machinery and turrets, while the ordnance shops in the country are preparing the armaments.

VALUE OF LITTLE PATENTS.

Our readers will remember the engraving of Harvey Brown's patent lamp chimney, which was published on page 240, present volume, Scientific American. Immediately after its publication the inventor was beset by applicants for the purchase of the patent, and a day or two ago he called upon us with a roll of bills for quite a sum which he had just received from the lucky purchaser of his patent, and besides he informs us he is to receive a handsome tariff on every article made. Who can say that little patents do not pay? Patents on small articles for which there is a great public demand always prove remunerative to the owner.

FUNSTON'S PENCIL SHARPENER.

We here illustrate one of those neat and convenient little inventions for which our countrymen are already famous—a device for sharpening slate pencils. Childrens' teeth are set on edge by the repeated



gritting, and grinding, which attends the important operation of getting a nice point on the instrument in question; to prevent this, and the spoiling of penknives, this invention was made. It consists of a single piece of sheet steel cut out blank from the material; the two sides of each end are then doubled over so that the edges form an oblique angle with the face of the instrument, after which the blank piece is folded together so that the edges are brought directly opposite each other. Fig. 1, represents the view of the sharpener at work; the pencil is inserted at the hole *a* and then pushed down until it comes in contact with the edges, *b*, Fig. 2, before spoken of, these constitute cutters, which, as the pencil is revolved, wear away its surface. Fig. 3, shows most clearly the operation of the cutting edges, *b b*, and otherwise explains itself. The whole affair is quite tasty and adapted to the end desired; good tools are always in demand, and the moral effect of a well-sharpened pencil must have its weight in the work to be performed.

Patented by A. C. Funston, Kensington, Philadelphia, to whom all letters should be addressed.

A Flying Peace-maker.

William Fields, of Wilmington, Delaware, informs us that he has invented a "Flying Peace-maker" for the destruction of iron-clad ships of war, which he declares no iron-clad vessel can withstand, so powerful will be the shock. He can operate it directly from the deck of the *Monitor* or any other iron-clad ship. The best part of it is, he can rig, as he asserts, two or three vessels in less than a week with but trifling additional expense. It can also be used against forts or an army on land with good effect. Mr. Fields writes us that he will soon be in New York to show us his wonderful discovery. We shall be happy to see him, and doubly so if the discovery is anything like as important as he announces it to be. We want something that will do the work in a short, sharp and decisive manner, and we trust it may not prove to be another Crimean panatechner.

THE POLYTECHNIC ASSOCIATION.

On another page will be found a report of the proceedings of the Polytechnic Association, on the evening of October 23d, and it will be seen that the report is unusually long. This is owing to the fact that the discussion was of more than usual interest. It so happened that the inventions presented to the notice of the Society either had been recently illustrated in our paper, or were so simple that they could be made intelligible without engravings, and they were all of public interest. Mr. Knight's experiment with his improved process of electrotyping particularly attracted the attention of the meeting.

India-Rubber Pen Rack.

An improved article of a pen rack has been laid upon our table by Mr. O. P. Smith, of No. 519 West Twenty-third street, which seems to us the best article for the purpose we have ever seen. It consists of a disc of india rubber confined between two brass plates, and has niches cut in its edge of various widths, into which the pen handle or pencil is inserted, the elastic nature and peculiar surface produced on the cleanly-cut rubber, retains the pens in their positions. The disc is not fastened rigidly to the standard, but revolves upon it, so that all parts are easy of access. The base is of marble and the whole affair presents quite an ornamental appearance.

A steel suspension bridge of one hundred yards span is now undergoing the scientific test at Birkenhead, England. The steel used in its construction stood the handsome test of seventy tuns per square inch of tensile strain.

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The Scientific American.

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VOL. VII. NO. 19.....[NEW SERIES.]....*Eighteenth Year.*

NEW YORK, SATURDAY, NOVEMBER 8, 1862.

SEVENTEEN THOUSAND PATENTS SECURED THROUGH OUR AGENCY.

The publishers of this paper have been engaged in procuring patents for the past seventeen years, during which time they have acted as Attorneys for more than SEVENTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,
No. 37 Park Row, New York.

THE GOLD MINES OF CALIFORNIA OF NO VALUE TO THE WORLD.

Gold-mining, provided the metal is used for coin, adds nothing to the wealth of mankind. If a man owns a steam engine worth ten thousand dollars, the engine forms this portion of the wealth of the world. And if the man devotes his surplus labor, besides that which is necessary to procure a living, or expends his surplus profits in constructing a second engine of equal efficiency and value, he adds another ten thousand dollars to the wealth of the world. But if he expends the same amount of surplus labor or profits in simply adding to the weight of his engine, without increasing its efficiency or usefulness in any respect, he does not by the operation augment the wealth of himself, of the community or of mankind.

In complex states of society, the innumerable exchanges of property which people mutually desire to make, are effected through the medium of money. The articles which first came into use as money were the more valuable metals; the natural properties of these substances—their indestructibility, portability, &c.—causing them to be sought for this use. As civilization advanced, and the organizations of society became more complex, certain individuals and associations exchanged their own notes, promising to pay either gold or silver or platinum on the presentation of the note, and these notes also came into use as money, being received by persons in exchange for articles of value on the faith that the stated quantity of valuable metal could be obtained for them at any time.

The money in circulation in this country amounts to about two per cent of the whole wealth of the country, and it is probable that in other countries the proportion is about the same. Now the point that we make is, that this proportion (of two per cent) will not be altered by doubling the amount of money in the world; for, prices will advance so as to double the nominal value of other property, and thus the proportion will be maintained. The price of an article is its value relatively to gold, or platinum, or whatever metal is the standard, and prices must vary with all changes in this relative value. If a bushel of wheat is worth as much as an ounce of silver at one time, it may, at another time, be worth as much as two ounces of silver from either of two causes: it may be twice as difficult to get the wheat, or twice as easy to get the silver. If twice as many pounds of gold and silver are thrown into use as money, it will take twice as many pounds to do the same work, and the work will be no better done by the larger quantity than by the smaller. Indeed, it will not be done as well; for one of the properties which make the precious metals convenient for use as currency is their light weight in proportion to their value, and if this is increased they are rendered less serviceable for this use.

A man who becomes rich by manufacturing or trading, generally increases the wealth of the country and of the world to an extent at least equal to his own accumulations, but the labors of the gold-digger add nothing to the wealth of mankind, inasmuch as they increase the weight of the currency without increasing its value. This applies, however, only to that portion of the gold which is used as currency; that which is used in the arts does increase the wealth of the world to an extent equal to the excess of its value above the cost of its production.

WHICH ARE THE BEST WAR SHIPS?

On another page we have given the views of Mr. D. McKay, with respect to the classes of vessels which he considers the best for war purposes. They are very different from those which seem to have been adopted, except in one case, by our naval authorities, Many of his positions are impregnable. Thus, for example, he places speed and power as the leading requisites for an effectual war ship. The advantages which a war vessel that can choose her own distance has over an enemy are self-apparent. We have continually urged this idea upon the attention of the public; and, since the late artillery experiments in England have demonstrated the practicability of entirely piercing through a 4½-inch plate and eighteen inches of teak, with shells, at a distance of 600 yards, great speed in vessels has become a greater necessity than ever. These experiments were made since Mr. McKay wrote his letter, and they must modify the opinions contained in it, in one important feature at least. He advocates wooden vessels plated with iron, and considers them superior to iron steamers. We understand by an iron war vessel one that is built with an iron framing, an interior lining of iron plate, like an entire merchant iron steamer covered with thick wooden planking, and thickly plated outside. His objections to such vessels are not satisfactory, because they are chiefly founded on the fact that iron vessels soon become foul on the bottom, while wooden vessels sheathed with copper keep clean and resist barnacles. This objection is just as good against iron merchant steamers as war vessels, and yet there has not been a wooden screw steamer built in England for more than ten years. The action of the screw tends to open the seams of a wooden vessel and cause leakage. An iron screw steamer, it is asserted by engineers of experience, will keep as tight as a boiler for years, while a wooden screw steamer soon becomes as leaky as a sieve. The rapid fouling of the bottoms of iron ships is undoubtedly a great evil, but this should only increase the efforts of inventors to discover an effectual remedy.

A very strong argument against mere wooden frigates, covered on the outside with plates, is based on the fact that their plates can now be pierced with incendiary and explosive shells, and they may be set on fire by such missiles, while an iron ship is not so subject to such a fate. Mr. McKay states as an argument in favor of wooden ships, that, in case of striking, "a wooden bottom is never injured in the like manner an iron one invariably is." This is contrary to very recent experience. In a letter published in the London *Mechanics' Magazine* (Oct. 3d) it is stated that while the new armor-clad frigate *Defense* was on a late cruise in the Baltic Sea, she struck bottom three times; on two of the occasions the sea bottom was sandy, but the third time the vessel grated upon a rock, while she was steaming at the rate of eight knots per hour. The shock was considerable, as it knocked an officer off the deck bridge, and those who were in their berths were awakened, and rushed upon deck in alarm. When she went upon the rock her bow was heaved up six feet, then she plunged six feet with her stern elevated when she went off. All on board expected that a large hole had been stove in her bottom and that she would leak badly. She, however, continued on her home voyage without any sign of leakage, but after having arrived at Portsmouth, she was at once put into dock and inspected, as all her officers were sure she was much injured. Upon a careful survey of her bottom, every plate and joint was found as sound as when she was launched; the sole damage was six rivets started. The correspondent referred to says, in reference to this case: "It is agreed by all on board that had she been a wooden vessel she would have stuck fast on the rock and injured herself very severely."

Mr. McKay states that the opinions of practical men in Europe are unfavorable to shield or gun-turret ships. It is not the case in America, where practical men have had the best opportunities for examining and studying their peculiarities. Such towers can be applied to any war vessel, no matter how large or fast she may be. The *Warrior* or *La Gloire* could be fitted with turrets just as well as the *Roanoke*. Shot is more liable to glance from the rounded sides of these circular batteries than from the flat sides of the French and English armor-clad batteries. It is believed that the *Roanoke* will be superior to any of the European frigates, on account of her gun towers, combined with her thick side plates and the heavy guns she will carry. Her 15-inch Dahlgrens will throw shot nearly twice as heavy as that of the Horsfall gun, which is the largest in England. The speed of the *Roanoke*, however, will be much less than that of the new European frigates.

The experience of shipbuilders and engineers with armor-clad vessels is very limited, and, in view of this fact, there is a commendable desire among them to examine, study, make comparisons, and collect facts on the subject, rather than adopt hastily, as the best, any of the systems of construction that are now practiced. It is only by collecting reliable facts respecting the construction and particular characteristics of such vessels, that correct conclusions can be arrived at in relation to their merits and defects. Such facts, combined with remarks pertinent to a calm discussion of the question, are contained in Mr. McKay's valuable letter.

A VISIT TO OUR WORKSHOPS—THE CONTINENTAL IRON WORKS.

The manufacture of iron vessels is comparatively a new branch of the engineers' and shipbuilders' business in this country. So far as we are informed, but four such establishments exist of any magnitude; these are the Continental Iron Works at Greenpoint, L. I., the Novelty Iron Works and Messrs. Delamaters of this city, and Harlan, Hollingsworth & Co., of Wilmington, Del. Other places have works wherein some ships of this class have been built, but the foregoing, we think, embrace the principal interests of the country in this department of shipbuilding. We paid a visit to the first one upon the list, a few days since, and were greatly interested in the various details which were pointed out to us by Mr. Thomas F. Rowland, the able director, as also to notice the energy which he manifests in driving forward the important Government contracts entrusted to his charge. The first notable features that arrest the visitor's attention, upon entering, are the vast extent of ground and the great number of men employed in the yard. The various buildings and shops, together with the vessels in course of construction, occupy a space of between seven and eight acres; and in some parts of this vast area so numerous are the workmen (1,200 in all) that locomotion is both difficult and dangerous; while in the appropriate places the machines necessary to accomplish the peculiar work required of them are found busily turning out those iron-clad monsters which we hope to render the admiration of the world. At the Continental Works was launched the famous *Monitor;* here also was built the *Passaic* and the *Montauk*, her consort, both now nearly finished. The *Kaatskill* and *Onondaga* are fast tending toward completion; and the *Puritan* (7,000 tuns), the largest iron-clad ship yet attempted in this country, is in course of construction.

In addition to the large amount of manual labor necessarily employed, the use of improved machinery performs no unimportant part. Here are huge shears that cut through plates of iron an inch thick, as if they were made of lead; here also are immense punches that come down upon those plates, forcing out large metal buttons as easily as a tinner can punch a hole

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through a nutmeg grater. On page 264 of the SCIENTIFIC AMERICAN we illustrated an iron planer of Mr. Rowland's, an adaptation of which we here saw hard at work, shaving off the edges of immense plates with the greatest celerity. In fact, all of the processes employed in the building of an iron-clad vessel are here performed in a short time. Upon one side of the yard, near the entrance, we saw a large turret in course of construction, which is intended for one of the new vessels, and is of the following dimensions: diameter, 23 feet outside; thickness of iron wall, 11 inches. The plates for these turrets are all obtained from the works of Messrs. Abbott, of Baltimore, Md., at the rate of forty per day; they are the largest rolling mills in the country, and the only ones capable of supplying the demand for extra large plates such as are used on turrets. These plates are put through the process of planing upon their edges to a standard size, and are then heated in a furnace and bent to the requisite sweep in a machine provided for the purpose; afterward, the holes are punched, a little less in diameter than the bolts, and the sheets set up in their places, the holes, which vary slightly from a true bore, are then drilled out by means of an ordinary drilling machine, ingeniously arranged upon a long piece of timber, and operated by a small engine. This timber has a bearing in its center, which works around a central shaft in the turret; and by this arrangement all the holes are easily run through, first with a drill, and then finished with a reamer. The use of this machine dispenses with the labor of no less than seventy-five men; it was not employed in the construction of the *Monitor*. Pursuing our way down the yard we come to the launching ways and blocks, on which the iron-clad batteries are now being built. A fine opportunity is presented to examine their models and bottoms; and we went underneath the long flat floor and slightly sharpened bow, where the sturdy sons of Vulcan were beating away with a force which made the whole fabric shake; and we saw how thoroughly every rivet was driven home, and how the various sheets which composed the bottoms of the vessels were nicely fitted to their places. The models are very plain; no attempt being made at high speed, but rather stability and sea-worthiness, both of which seem to be attained.

Mr. Rowland himself is ubiquitous; he is inquired for on every side, overseeing the most minute details, he seems to accomplish in his own person the work of two or three men. Under his direction matters of detail have received an attention which has amply repaid the time expended; for instance: a simple apparatus for launching ships which he showed us, and which he has employed successfully on three occasions. Instead of the usual dog-shores, he employs a shaft about three inches in diameter, running across from one side to the other of the ways, having a wrought iron toe forged upon it. This toe works in a recess cut in the ways; the shaft is retained in place by a long handle or lever which at the proper time is released; the toe then throws against the after-side of the recess and starts the ship off. Should she stick, however, from any cause, the toe, being cam-shaped on the back, exerts a great lifting force, which can be quickly applied to the vessel, and the launch is effected.

After quitting the yard we went over the *Passaic*, a brief description of which will be found on page 284 of the SCIENTIFIC AMERICAN. Retracing our steps, and proceeding from the more active operations of the yard, we entered the loft where the models and molds are constructed; this is a long room admirably suited for the purpose; here is to be seen the model of the *Puritan* (now constructing), the model of the first *Monitor*, and other details belonging to this part of the ship-building profession. We noticed also in the draughting room a neat library of scientific works, which are doubtless frequently consulted. Aside from the mechanical details of the business, nothing struck us more than the steady stream of men pouring out of the yard at twelve o'clock, when the bell rung for dinner. Here and there, beside the turrets, little family groups, who had brought dinners to stalwart workmen, spent the brief time allotted to them in preparing it as attractively as their kind hearts could suggest. Here also, were children of tender years, tottering among the fragments of machinery with which the yard was littered, carrying the precious kettle containing their father's dinners; these were peaceful contrasts to the other sights of grim-visaged War that prevailed on every hand.

HOW TO CHOOSE AND KEEP A RIFLE.

How to choose a rifle is at once a mysterious and ponderous question, not only to hundreds but to thousands of persons. A contributor to the *Atlantic Monthly* gives some very good advice to assist all those who have either the curiosity or the ambition to become marksmen, in selecting their "shooting irons." The first part of the advice is as follows:—"Never buy a gun, and least of all a rifle, without trying it, and do not be satisfied with a trial in a shop or shooting gallery, but take it into the field, and if you distrust yourself get some one in whom you have confidence to try it for you." This is all very well, but no stranger could go into a gun store and modestly ask for one or several rifles to give them the benefit of a field trial, as a preparatory process toward the purchase of one; still in the selection of a first-rate rifle such a trial should always be first made. The way to do this is given as follows:—"Choose a perfectly calm day. Have a rest prepared upon which not only the gun may be laid, but a support also secured for the elbow; the shooter being seated. By this means, and with the aid of globe and peek-sights (which should always be used in trying a gun) it may as certainly be held in the same position at every shot as is if it were clamped in a machine. For the target take a sheet of cartridge-paper and draw on it a circle of a foot in diameter, and inside of that draw another four inches from it and paint the space between black, leaving a white bull's-eye four inches in diameter against which the globe-sight will be more distinctly seen than if it were black. The target should be placed so that the sun will shine on your back. On a very bright day brown paper is better than white. Begin shooting at 100 yards, and fire ten shots aimed directly at the bull's eye, without wiping the gun out after each shot. Do not look to see where you have hit till you have fired the string of ten shots. . . . . If you find, when you get through, that all the shots are close together, you may be sure that the gun shoots well, though the hits may be some distance from the place aimed at. That would only prove that the line of sight was not coincident with the line of fire, which can easily be rectified by moving the forward sight to the right or left, according as the variation was to the one side or the other. Having fired the string of ten shots, take a pair of dividers, and with a radius equal to half the distance between the two hits that are most distant from each other, describe a circle cutting through the center of each. From the center of this circle measure the distance to each of the hits, add these distances together and divide the sum by ten, and you have the average variation, which ought not to be over two inches at the utmost. If the gun is what it ought to be, and fired by a good marksman, it will probably be much less. This is a sufficient test for precision for that distance, and the same method may be adopted for longer ranges. But if the gun shoots well at one hundred yards, its capacity for longer ranges may be proved by its penetrating power." When fired at a target of dry pine set at a hundred yards distance, if the bullet penetrates nine inches it may be considered equal to a range of six hundred yards; if it penetrates twelve inches it may be considered equal to a range of one thousand yards. Many persons suppose that the best way to increase the range is to increase the charge of powder, and that a certain amount of powder, varying for every range should be used. But it is held by first-rate marksmen that a specific charge should be used for all ranges, and that the increased range should be obtained by elevating the sight. The contributor to the *Atlantic Monthly* states "the proper charge of powder for every rifle is about one-seventh the weight of the bullet." A very common way of testing the charge capacity of a rifle is to commence a series of shots with a small charge and increase the quantity every shot until the rifle kicks, when the charge used for the previous shot is selected as the best for all occasions. This is not a good method, because a rifle sometimes kicks with a very small charge and not with a large one. The kicking almost always depends on the lubrication of the patch and the condition of the barrel.

Some useful directions are given for the purpose of keeping a rifle in order. After firing it should be wiped with a clean wet rag—Canton flannel is stated to be the best; then it should be wiped dry and oiled. We have found that refined petroleum is about the best liquid that can be used for wiping out a rifle barrel, which should always be kept as bright as a looking-glass or good shooting cannot be expected from it. A rifle oiled with refined petroleum, in which a little bees-wax has been dissolved, may be laid by for a year without a speck of rust gathering upon it. Of course the whole residue of the powder must be first washed off with a wet rag. The most sure way of obtaining a first-rate rifle is to engage it of a first-rate maker. There are several of such in the country who prefer to have their rifles fairly tested before being purchased. As with a new ax, however, so it is with a rifle. It takes some time to "get the hang of it;" and as every marksman has his peculiarities, so one may shoot well with one rifle and not with another, while the reverse would be the case with the same rifles by another marksman equally as good. The finishing advice which we would give to a marksman is: when you get a good rifle—one with which you are a sure shot—"hold on to it!"

DEBATING SOCIETIES.

The long winter evenings are at hand, and the hours should be spent in some pursuit or employment that shall make the time so passed useful and profitable. In most of our villages and towns there are literary societies, formed of young men who meet together for mutual improvement; some miscellaneous exercises are gone through with, poetry and essays read, and the proceedings generally wound up with a studied debate upon some fixed question. Now, the oratorical part of these entertainments is a good feature, but it too frequently happens that the subjects propounded are foolish and silly to the last degree. The public are not immediately interested in the comparative merits of Marc Antony and Andrew Jackson, nor do they care about discussing the query as to whether women are entitled to the elective franchise or not. Debate, to be useful, must involve the discussion of some new doctrine, question or theory, and must elucidate knotty points, either of science, art or law, in such a manner that it shall add to the stock of popular knowledge. In this way debating societies disseminate useful instruction and are the means of substantial good. Why not then discard all trite and hackneyed subjects and confine the arguments to the consideration of matters relating to social economy, to invention, the adaptation of improvement relating to the saving of human muscle; all or any of these things offer a great field for profitable research.

THE CONDITION OF OUR IRON-CLAD VESSELS.

The work upon our iron-clad vessels is prosecuted with great vigor night and day, the week round. Men are busy in completing the *Roanoke*, *Moodna* and others. The former vessel has her plating all on, with the exception only of a few plates; the engines are in good order, requiring but little adjustment to fit them for sea, and the turrets are now being bored for the gun ports. A short time will suffice to set her in battle array. The *Moodna*, better known as "the Witney battery," is also fast verging toward completion; her appearance is certainly singular, and she promises to be a formidable antagonist. The stationary turrets are partially set up, and the armor is being placed upon her as rapidly as human hands, aided by machinery, can do it. Four of our iron-clad ships, therefore, will, from the appearance of affairs at the present time, be ready for service before the lapse of the year; two of them, the *Passaic* and *Montauk*, much before that.

THE Peoria (Ill.) Gas Company has not only assumed the payment of the government tax, but has reduced the price of gas one dollar per thousand feet. This example is a standing rebuke to all those who propose not only to keep up the price of gas, but to tax their consumers to pay their share of the public burdens.

DURING the 4½ hours that the *Monitor* was in action at Fort Darling, the thermometer indicated 140° in the fireroom, and 110° in other interior portions.

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RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Engine Stop Motion.—The object of this invention is to effect, automatically, the stoppage of a steam engine, water wheel or other motor regulated by a governor, whenever the governor stops, owing to the breaking or slipping-off of its driving band, or from any other cause. There is employed for the stoppage of the motor a stop valve gate having no direct connection with the governor, but having a spring weight, or other device, applied to close it when it is not held open by other means; and the invention consists in a certain arrangement, in combination with the valve and in relation to the governor, of a hook or catch, which holds the valve open while the governor is in operation, but which is caused by the stoppage of the governor to liberate the valve and allow it to be closed by the weight, spring or other device applied for the purpose. The device is the invention of H. B. Beckman, of Newburyport, Mass.

Violins.—Among the patents recorded in our columns this week is one granted to G. Henry Hulskamp, of Troy, N. Y., for an improvement in violins, that presents several features of novelty, the most striking of which we will briefly describe. The interior of the instrument is provided with a double or two-way screw, placed midway between a set of bars that are connected with the sounding boarding. By turning the screw the sounding board may be *stretched*, and thus, it is said, the power of the instrument and the quality of the tone are greatly improved. The invention is simple in its character and easily applied, not only to violins but to guitars and nearly all forms of stringed instruments. Mr. Hulskamp is well know as the inventor of a number of highly valuable improvements in musical devices. He is now in Europe, where he was an exhibitor at the late Great Exhibition; and the invention which we have above described was considered by the jurors of such decided importance and novelty that they gave it the highest award—a medal. Considerable difficulty has heretofore been experienced in pianoforte-actions by the swelling, shrinking, loosening and rattling of the jack-lifter lever. Another patent, granted to Mr. Hulskamp, and found in the list of claims of this week's issue, covers a very simple but ingenious method of compensating for all such bad resutls as those named, and of effecting a very durable connection between the key and the parts belonging to the hammer.

Mill-stone Dress.—This invention consists in the arrangement of a V-shaped guide attached to the front edge of the hinged adjustable rule of a mill-stone dress, in combination with a V-shaped lug attached to the edge of this diamond holder in such a manner that the point of the diamond is prevented falling down into the holes or cavities which inevitably occur in the surfaces of millstone, and that lines of equal depth can be drawn with ease and facility. It consists also in the application to said rule of one or more serrated spring catches, in such a manner that the operator is prevented from moving the diamond across the surface of the stone in the wrong direction. It consists, finally, in the arrangement of an adjustable spring slide in combination with the diamond and its holder, in such a manner that the power with which the diamond bears down upon the stone can be regulated, and that said pressure, when regulated, remains uniform until changed by the operator. J. E. Karelson, of No. 69 Nassau street, New York city, is the inventor of this improvement.

Sawing Machines.—This invention consists in the arrangement of a hinged roller arm, the rear end of which slides on the circular edge of the standard that serves to feed the log toward the saw, in combination with the hook or dog, intended to fasten the log at the under side and with a hand lever, in such a manner, that by the action of said hand lever and roller arm, the hook, together with the log, is drawn up tight against the face of the standard and held firm as the sawing proceeds, thereby saving the necessity of turning the long over more than once during the operating of sawing. It consists further in the arrangement of a tripple crank lever in combination with slotted connection rods and with the two shells which form the nut for the screw that serves to feed the standard and log toward the saw, in such a manner that said shells can be thrown in or out of gear with the feed screw, and that the standard can be moved independent of said screw whenever desired. It consists further in the employment of a telescope tube in combination with and secured to the sliding standard and surrounding the screw in such a manner that an accumulation of sawdust in the screw thread is prevented, and a correct action of the two half shells, when thrown in gear with the screw, is insured. It consists, finally in the arrangement of an adjustable roller on the slab side of the log for the purpose of keeping the lumber or the log steady and to prevent the same from springing during the operation of sawing. The second part of this invention relates to certain improvements in those parts of a saw gear, which serve to feed the log toward the saw and to determine the thickness of the boards to be cut; said parts being so arranged that the thickness of the cut can be changed at pleasure and that the feed can be effected by hand or automatically by the machine itself, as may be desired, and that, in gigging back, the feeding device can be automatically thrown out of gear or rendered ineffective. These improvements have been secured by two patents granted to Messrs. J. R. Williamson and S. Forsythe, of Seabeck, Washington Territory. Their post-office address is Coveland, Island county, W. T.

Harness Motion of Power Looms.—This invention consists in certain improved means of controlling the operation of the harness of a power loom for fancy weaving, whereby the weaving of a long and very varied pattern is provided for without the necessity of using a pattern chain of great length. The invention is patented by D. M. Ayer, of Lewiston, Maine.

Belt Shippers.—This invention consists in a certain novel arrangement of an oscillating double-elbow piece, and a single spring locking pawl, in combination with a two-notched shipping slide which carries the belt guide, and with a lever or its equivalent whereby, when the slide has been locked by the pawl with the guide in either of its two positions, for guiding the belt, the pressure applied to the lever or its equivalent to shift the slide for shipping the belt, will first cause the elbow lever to disengage the pawl from one notch and so unlock the slide, and then give the latter the proper movement, and that when, after the movement of the slide has been given, the pawl is allowed to enter the other notch of the slide and so lock it until the pressure on the lever is reversed. This invention obtained a prize in the International Exhibition, London, and the inventor, J. C. Goar, of Jamaica Plain, Mass., disposed of the English patent (obtained through our agency), for a large sum.

Piers and Bridges.—The object of this invention is to construct piers and bridges in such a manner that they will be very durable, equally so as stone, and much less expensive, not greatly exceeding the cost of good wooden structures of the kind. To this end the invention consists in the employment or use of hollow cast-iron columns filled with concrete or cement, and supported on wooden piles below the surface of the bed of the river or stream. The cast-iron columns support iron girders on which an arched flooring of masonry rests, the flooring being covered with sand or cement on which a trap-rock or other suitable pavement is laid. The inventor of this device is W. H. Wood, of Hudson City, N. J.

An Impregnable Porthole.

A London paper says that visitors to the National Exhibition will see in the naval department a small gun on a traversing carriage, which is intended to show a new mode of filling the aperture of a porthole with a revolving shield. The gun goes out through a ball, or spherical revolver. This revolver moves on axles, and allows the gun to be turned in every direction; and which ever way the gun is pointed, whether elevated, depressed, or trained aft and forward, there is no opening disclosed for the entry of a minie bullet. When the shot is discharged, the gun recoils, and the revolver turns, and presents a closed appearance to the exterior. This plan permits ports to be made larger, and guns can be so depressed as to fire into a vessel nearly under the muzzle.

The Tax Law—What it Requires.

The following convenient summary of the Tax law is given in Thompson's *Reporter*:—

Bankers (not corporated banks) pay a license of $100. Bankers receive deposits, discount, and pay checks and drafts.

Brokers pay a license of $50. Brokers buy and sell specie, uncurrent money, stocks and exchange.

Banks that do any brokerage business as defined above, must take out a broker's license, $50.

Land Warrant dealers must pay a license of $25.

Bond and Mortgage.—Stamps are required for each instrument; one for the bond and one for the mortgage.

Income Tax.—This tax is to be paid on the income of the year commencing January 1, 1862, so that on the evening of the 31st of December, everybody should have a very clear record of their income gains or profits for the year. And as many sources of income, such as dividends and railroad bonds and stock, insurance stock, savings bank interest, &c. (they having already paid the income tax), are not again taxed, it therefore becomes necessary to have a clear record of the sources of income, that there may be no dispute with the assessor.

The income tax for the year 1862 is payable on the 1st of May, 1863.

A man in business must make up the net profits of his business for the year, and pay the tax on the amount, less $600.

A man may, outside of his business, spend all and even more than his profits in business; nevertheless he must pay tax on all net business profits except the $600. And so with a salary; all over $600 must be taxed, though personal or family expenses consume it all.

Checks, drafts, and orders for money, whether at sight or on time, if for sums of $20 or under, are not required to be stamped.

Notes of hand, due bills, &c., if for sums of $20 or under, are not required to be stamped.

Certificates of deposit, for any amount, require stamps; 2 cents for $100 and under; 5 cents for all over $100.

All checks and sight drafts for sums over $20, require only 2 cents for any amount.

Time drafts and notes require stamps in proportion to the amount; 5 cents and upward.

Foreign drafts, if single or solo, whether at sight or on time, are on the same scale as inland time drafts and notes of hand; but if drawn in sets, the first, second and third must each be stamped according to the scale of foreign bills in sets: 3 cents and upward.

The payer is required to stamp bills made abroad at the time of accepting, if on time; and at the time of paying, if at sight.

The party attaching or first using the stamp, is required to cancel it, by putting his initials and the date upon it. The penalty for not doing so is $50; but in case the maker of the instrument omits to cancel the stamps, the party receiving it, or the payer, may cancel it. This, however, will not relieve the maker from the penalty.

After naming a few "certificates," such as shares of stock, deposits, &c., the law says, "certificates of any other description than those specified, ten cents."

A great many papers in common use will be necessarily changed in form, from a certificate to an assertion of fact. A thousand dodges to avoid the tax will be adopted; but, as a general thing, good business men will pay the tax on their money transactions rather than trust to a dodge that may or may not stand in law.

Machine Shops and the War.—We intend to devote considerably more attention to operations connected with our machine shops, and to pay less attention to the details of mere military movements. The first of our series on this subject appears in the present number—entitled "A Visit to our Workshops"— and we doubt not it will be perused with much interest by all our readers.

Military Stores.—The imports of war stores, at Quebec, have been very extensive recently. The *Great Britain* brought out a large quantity of rifles and other war material, for the military authorities, which have been landed within the last few days and stored.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 21, 1862.

Reported Officially for the Scientific American.

***** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

36,694.—B. R. Alden, of New York City, for Improvement in Lamp Burners:

I claim, first, A lamp burner provided with a cone or deflector constructed of porcelain, pottery, earthenware, or any baked earth or earthy cement, substantially as set forth.

Second, The combination of said cone with the case or jacket, C, arranged substantially as and for the purpose specified.

[This invention consists in the employment of a cone or deflector constructed of porcelain, pottery, earthenware, or any baked earth or earthy cement, which is a good non-conductor of heat; said cone being applied to a case or jacket, which surrounds the wick tube, substantially as hereinafter fully shown and described, whereby many advantages are obtained over the ordinary metal cones or deflectors, hitherto used in coal-oil lamps.]

36,695.—J. F. Allen, of New York City, for Improvement in Valve Gear of Steam Engines:

I claim the herein described arrangement of valves, worked by means of separate rods and levers operated from the action of a single eccentric, the whole being combined and operated in the manner and for the purpose substantially as set forth.

36,696.—W. W. Andrews, of Warrensville, Ohio, for Improved Belay Cleat for Boats:

I claim the special arrangement of the pendulated weight, B, cam, D, and clutches, E, in combination with the pins, F, and springs, K, the several parts being arranged substantially as and for the purpose set forth.

36,697.—D. M. Ayer, of Lewiston, Maine, for Improvement in the Harness Motion of Power Looms:

I claim, first, The construction of a pattern chain of a series of pin jointed links, provided with mortises, u u, and a series of pin bars, Q Q, fitted to slide longitudinally in the said mortises, substantially as and for the purpose herein specified.

Second, The drum, T, having a series of pins, 16 16 16* 16*, spirally arranged on its periphery and the cam, S, applied and operating in combination with each other, and with the sliding bar, R′, or its equivalent, carrying guides, R R, or other devices for the purpose of shifting the sliding pattern pin bars of a pattern chain or cylinder, substantially as herein set forth.

Third, The employment for producing the longitudinal movements of the drum, T, upon its shaft, U, of a screw thread, 40, in the hub, two levers, X X′, and a spring catch, 26, applied within the shaft, a pin, 34, attached to the drum and a spring, Y, applied between the drum and shaft, the whole combined and operating substantially as herein specified.

36,698.—J. S. Barden, of New Haven, Conn., for Improvement in Water Meters:

I claim the above described arrangement of the eduction passage, valve chest, water chambers, cylinders, pistons, valves and valve operating mechanism, as applied in manner, and so as to operate together substantially as set forth.

I also claim the tenoned stuffing boxes and the slides, applied in the case and its partition and shaft, K, substantially in manner and for the purpose as specified.

36,699.—H. B. Beckman, of Newburyport, Mass., for Improved Automatic Stop Motion for Steam Engines:

I claim the catch lever, E c d, arranged and applied in relation to the governor, and in combination with the stop valve or gate, substantially as and for the purpose herein specified.

36,700.—L. A. Beebe, of Chicago, Ill., for Improvement in Machines for Shelling and Cleaning Corn:

I claim, first, The semi-circular discharge aperture, a, and the corresponding adjustable plate, a′, combined and arranged as set forth for regulating the discharge of cobs from the mill.

Second, Combining with the shelling apparatus, constructed as herein described, the shoe, D, with its inclined boards, c d′ G, screens, l d, and trough, e, the fanning mill, E F, and elevating trough, H, all arranged and operating as a whole, as and for the purposes herein set forth.

[This invention consists in regulating the discharge of cobs from the shelling cylinders, by means of an adjustable sliding sector plate, arranged at the discharging end of the shelling apparatus, also in a shelling apparatus having an open grating in its bottom, through which the grains of corn are discharged, a shoe, consisting of inclined boards, screens and discharging trough, a fan and an elevator, so combined and arranged in relation to each other, that the shelled corn will all be cleaned and concentrated to a point where it will be elevated and discharged from the machine.]

36,701.—John Burnside, of Washington, D. C., for Improvement in Portable Houses:

I claim the hooks in the posts in combination with the notches in the boards, for the purpose of making the lower edge of one board hold the top edge of the board next below it, substantially as described.

36,702.—H. H. Cooley, of Battle Creek, Mich., for Improvement in Pistons for Force Pumps:

I claim the piston, A, divided into three compartments, b b′ c, the latter, c, communicating with b b′, by means of the openings, d d′, and provided with the ball valve, C, in combination with the tubular piston rod, B, all arranged to operate in connection with a pump cylinder provided with a side water passage and suitable valves, as set forth.

[This invention consists in constructing the piston with two water passages and a valve chamber, the latter being provided with a ball valve, and communicating with a tubular piston rod, all being arranged in such a manner, and in connection with the pump cylinder, which is provided with suitable valves, so as to throw a continuous stream.]

36,703.—A. C. Dewies, of Crefeld, Prussia, for Improvement in Lubricators:

I claim the combination of the transparent vessel, A, the stopper, C, and the tube, B, having its flow regulated by the perforations in the end within the vessel, A, and the other end adjusted to the curvature of the shaft with the journal-box, D, and shaft, E, when the whole are constructed, arranged and operate as described for the purpose set forth.

36,704.—C. S. Dikeman, of New York City, for Improved Composition for Treating Vegetable Paper:

I claim the employment or use for the purpose of preparing vegetable paper of a composition made of the ingredients herein specified, and mixed together in about the proportion, and substantially in the manner described.

[The object of this invention is to prepare that kind of paper known as vegetable paper, and generally used for covering artificial flowers put up in suitable boxes.]

36,705.—Jacob Dobbins, of Litchfield, Mich., for Improved Machine for Jointing and Dressing Staves:

I claim, first, The swinging segment bed, H, provided with the clamp bar, Q, and attached to a radius bar, I, in combination with the rotary cutters, D D′, arranged to operate as and for the purpose herein set forth.

Second, The particular manner of arranging the radius bar, I, so that its rack, G, may be connected with the driving pinion, k, and be disengaged from it, to wit, by means of the frame, J, catch M′, and set screw, P, as described.

Third, The yielding frame, F′, to which the gearing, j k, is fitted, when arranged with the spring, f, set screw, h, and gearing, E i, to operate as forth.

Fourth, The swinging supports and gage bars, U U, when used in combination with the swinging bed, H, and clamp bar, Q, as and for the purpose specified.

Fifth, The sliding frame, V, provided with the reversible bolster, Y, and clamp bar, Z, in combination with the rotary cutters, C C, and bevelled rods, C″ C‴, as and for the purpose set forth.

Sixth, The dog bars, D″ D‴, when attached to the sliding frame, V, and used in connection with the cutters, C C, as and for the purpose specified.

[This invention relates to an improved means for dressing the staves, whereby the work may be performed expeditiously and in a perfect manner, and the machine is made to operate upon stuff of different thicknesses, as well as being capable of being adapted to operate upon winding stuff.]

36,706.—Samuel Gissinger, of Alleghany City, Pa., for Improvement in Brick Machines:

I claim the use of the beveled arms, y and q, and the gage, s, when used in combination with the press roller, h, lever, i, and mold way, g, arranged and operated substantially as herein described for the purpose set forth.

36,707.—J. C. Goar, of Jamaica Plain, Mass., for Improvement in Belt Shippers:

I claim the combination with the belt slide, C, and the spring locking pawl, E, of the double-acting detacher and slide mover, D, in the manner herein shown and described.

36,708.—James Greaves, of Utica, N. Y., for Improvement in Pumps:

First, I claim the combination and arrangement of the flange, 3, and base, 2 2, as constructed and combined with the upper part, 1, and spout, 3, metal band, 5, as fastened to the wood pipe, 4, the elbow, 9, and flange, 10, as combined with the rod, 7, and pipe, 4, said pipe being the only support of the barrel, 8, and the barrel, 8, when constructed of stoneware or earthenware, all as shown in Fig. 1, as and for the purposes described.

Second, The rubber pipe, 12, as combined with the iron pipe, 11, and earthenware pipe, 15, the enlargement, 13, ring, 14, and rod supporter, 16, all shown in Fig. 1, all as and for the purpose described.

36,709.—Edward Gwyn and A. C. Campbell, of Hamilton, Ohio, for Improvement in Breech-Loading Fire-arms:

I claim, first, The contrivance above described for withdrawing a breech plug from its seat, depressing it to make room for the insertion of the cartridge, then elevating it, and afterward carrying it longitudinally back to its seat, by the simple revolution of the screw pin, backward and forward in the arc of a circle around a fixed center, substantially as above set forth.

Second, I claim the combination of the lever, a, the fulcrum, b, the screw pin, c, the breech plug, d, with its guide, m, and the spring, f, constructed, arranged and operated substantially in the manner and for the purpose above set forth.

36,710.—N. S. Hamlin, of St. Louis, Mo., for Improvement in Physicians' Prescription Cases:

I claim the case, A; consisting of three wings and a middle portion, each provided with pockets, d e f g and g′, arranged in the manner and for the purpose set forth.

[This invention consists in a folding case made of leather or other suitable flexible material, and provided on its inner side with a series of pockets to receive the several receptacles containing the drugs, medicines, compositions or other substances most generally used by physicians or surgeons, particularly in the army, in such a manner that the case containing the several drugs or other substances can be conveniently folded up and put in the pocket, when the same is not used, or that it can readily be opened and unfolded when it is desired to use some of its contents.]

36,711.—Derastus Harper, of Crystal Lake, Ill., for Improvement in Plows:

I claim, first, The standard, A, constructed of wrought iron in angle form, expanded at its lower part, and united at its upper part to form a solid flat bar; in combination with the mold board, B, landside, C, and share, E, attached to the standard, and all arranged as set forth.

Second, The bar or sole, F, of the landside, C, constructed of wrought iron in angle form at its back part, turned upward at its front part, and secured to the standard as shown, for the purpose specified.

[The object of this invention is to obtain a plow which will be extremely light, strong and durable, have a neat appearance, and be capable of being manipulated with greater ease or less labor than those of ordinary construction.]

36,712.—G. H. Hulskamp, of Troy, N. Y., for Piano-forte Action:

I claim, first, The combination of the vibrating detacher, J, and its adjustable stem, L, with the jack, I, substantially as herein shown and described.

Second, I claim the form and peculiar construction of the hammer butt, D, of the jack, I, and of the detacher, J, substantially as described.

Third, I claim the mode of attaching the levers, hinge butts, &c., substantially as described, or its equivalent, for the purpose of preventing looseness, and the effects of shrinking and swelling.

36,713.—G. H. Hulskamp, of Troy, N. Y., for Improvement in Violins:

I claim, first, The use of strained sounding boards, in violins and other instruments above named and referred to, of whatever material made, operating and constructed substantially as set forth.

Second, Having the middle portion of the under sounding board, as shown at C C, made wider than the corresponding middle portion of the upper sounding board, substantially as and for the purpose herein shown and described.

Third, Making one foot of the bridge to bear upon the upper, and one upon the lower sounding board, either directly or by means of the tripod or post, as above set forth.

Fourth, The construction of the nut, U, and bridges, with the flat projection surface, substantially as described.

Fifth, The combination of the string-holder, E, with one or more internal braces, H, substantially in the manner and for the purpose herein shown and described.

36,714.—Edward Johnson, Jr., of Cleveland, Ohio, for Improvement in Cooking Stoves:

I claim making the oven plate of cooking stoves of one entire piece of corrugated sheet iron, as and for the purpose substantially as herein set forth.

36,715.—J. J. Johnston, of Allegheny City, Pa., for Improvement in Wooden Soles for Boots and Shoes:

I claim the use of the detached elastic spring, i, when used in connection with the hinge, j, recess, g, outer sole, b c, and inner sole, d e, arranged, constructed and operated substantially as herein described and for the purpose set forth.

36,716.—J. E. Karelson, of New York City, for Improvement in Millstone Dressers:

I claim, first, The arrangement of the V-shaped projection, l, at the front edge of the rule, C, in combination with a corresponding groove, m, on the diamond holder, H, constructed and operating substantially as and for the purpose shown and described.

Second, The application to the rule, C, of one or more serrated spring bars, G, substantially as and for the purpose specified.

Third, The arrangement of the adjustable slide, p, and spring, r, in combination with the head, n, containing the diamond, and with the set screws, q and s, and V-shaped groove, m, all constructed and operating as and for the purpose described.

Fourth, Connecting the rule, C, to the plate, A, by means of hinges, c c e, or their equivalents, substantially as and for the purpose described.

36,717.—A. C. Ketchum, of New York City, for Improvement in Lamp Burners:

I claim, first, A lamp burner having a metal wick tube, B, surrounded by a case or jacket, C, of porcelain, pottery earthenware, glass or any baked or unbaked clay or earthy substance, which is a good non-conductor of heat, substantially as and for the purpose herein set forth.

Second, A cone or deflector, D, constructed of metal and enameled both externally and internally, and applied to the case or jacket, C, or to the lamp, substantially as and for the purpose herein shown and described.

[The object of this invention is to obtain a lamp burner which will not conduct the heat from the flame down to the body of the lamp in such a degree as to volatilize the oil too rapidly, and which, at the same time, will cause the flame to be supplied with air in a comparatively cool state, and in sufficient volume to ensure perfect combustion, the supply of air to the flame being commensurate with the supply of vapor.]

36,718.—C. Krogh and M. G. Hogness, of Kroghville, Wis., for Improvement in Mode of Raising Sunken Vessels:

We claim, first, The employment, in combination with the flexible bags or flexible chambers for raising sunken vessels, of inflexible lifters applied outside the vessel, and operated substantially as herein set forth.

Second, The arrangement of the connections of the air pipes for the admission of air to expel the water from the lifters, at or near the bottom of the lifters, substantially as and for the purpose herein specified.

Third, The weighted flexible pipes, f f, applied to the lifters, and operating substantially as and for the purpose herein specified.

[This invention consists in the raising of sunken ships and other vessels, and in the prevention of damaged vessels from sinking, by placing air-tight bags or chambers of flexible material within, and suitable air-tight chambers or floats around them, and forcing air into the said bags, chambers or floats. It also consists in the arrangement of the openings for the introduction of the air into such chambers or floats, at or near the bottom thereof, that the said openings may be sealed by the water itself, and the air effectually prevented from escaping from the vessel. And it further consists in the attachment to the above-mentioned openings of weighted, flexible pipes, by which their outer orifices are kept below the body of the float or chamber, in case of the latter getting displaced in the operation.]

36,719.—W. H. Leech, of Dunlapville, Ind., for Improvement in Field Fences:

I claim the arrangement of the pacing boards, D, in combination with the notched braces, E, wedges, e, notched posts, B, and rails, A, all constructed and operating substantially in the manner and for the purpose herein shown and described.

[This invention consists in the arrangement of a pacing board catching over the fence post and supporting the panel, in combination with notched braces, which are secured by suitable keys in mortises in the ends of said pacing board, and the upper ends of which catch into notches in the edges of the post, in such a manner that by the combined action of said braces, pacing board and post, the fence is firmly supported, and all its parts can be united without the use of nails.]

36,720.—H. W. Libbey, of Cleveland, Ohio, for Improvement in Vapor Baths:

I claim the perforated or wire gauze floor, A, and adjustable trough, B, in combination with the perforated adjustable seat, C, and foot rest, C′, adjustable back rest, D, and neck piece, G, the several parts being constructed, arranged and operated as and for the purpose herein specified.

36,721.—J. V. Meigs, of Washington, D. C., for Improvement in Breech-Loading Fire-arms:

I claim the combination of the reciprocating piston or breech plug, C, with the pivoted slotted link, D, when constructed and arranged substantially as described, for the purpose set forth.

36,722.—T. T. Morrell, of Farmington, N. H., for Machine for Making the Leaves of Books from a Continuous Sheet of Paper:

I claim, first, In combination with one or more sets of fountain pens for ruling the horizontal lines of a page, a set of ruling rollers for printing the perpendicular lines, substantially as herein shown and described.

Second, I claim the reciprocating paging apparatus arranged and operating substantially as shown and described, for the purpose specified.

Third, I claim the peculiar cutting apparatus, arranged and operating substantially as described, for the purpose specified.

Fourth, I claim the peculiar construction and arrangement of the folder, f, and the folding rollers, P P, substantially as shown and described, for the purpose specified.

Fifth, I claim the combination and arrangement of the several apparatuses composing the within-described machine, whereby the successive operations may be performed in their proper order upon a continuous sheet of paper, while in motion, substantially as herein specified

36,723.—A. F. Newell, of Warren, Ohio, for Improved Fruit Basket and Crate:

I claim the within-described fruit basket and crate, as a new article of manufacture, consisting of the sides, A, cover, C, band, D, with loops, F, and the baskets, H, all constructed and arranged as and for the purpose substantially as set forth.

36,724.—A. W. Olds, of Green Oak, Mich., for Improvement in Cultivators:

I claim, first, The adjustable axletree, I, bearing wheels, K and K′, in combination with the cultivator frame, A B, axis, C, and pipe box, E, when these parts are arranged and operated as and for the purpose specified.

Second, I claim the bell-shaped, round-shanked tooth, constructed and operating as and for the purpose herein set forth.

36,725.—Oscar Paddock, of Watertown, N. Y., for Improvement in Ice-Cream Freezers:

I claim, first, In ice-cream freezers of otherwise ordinary construction and operation, the method described of imparting rotary motion to the freezing vessel, while the scrapers are held stationary by the employment, in combination with a spindle bearing in a socket in the bottom of the freezing vessel, of a pivot cast to the said vessel and bearing in a socket in the ice bucket, the whole being arranged to operate substantially in the manner herein set forth.

Second, I claim the employment of stirring blades arranged to the bottom of the cream-holder, to mix with the ice particles and dissolve the salt that shall have been carried to the bottom, substantially as herein set forth.

Third, In combination with a revolving cream-freezing vessel, and stationary scrapers, I claim the use of revolving beaters fast on the spindle, operating in connection with stationary beaters fast on the scrapers, substantially in the manner and for the purposes set forth.

36,726.—J. A. Pease, of New York City, for Improved Clothes Dryer:

I claim the combination and arrangement of a clothes dryer, substantially as before described.

36,727.—John Platt and William Richardson, of Oldham, England, for Improvement in Machinery for Cleaning Wool:

We claim the combination of the spiked roller, c, vibrating comb, 6 7, toothed plate, h i, roller, k, breast, l, vibrating blades, o 12, bell crank levers, 10, and connecting rods, z p 9, all constructed, arranged and operating substantially as and for the purposes shown and explained.

[In this arrangement of machinery or apparatus there is employed a roller, against which is fixed a blade, between which and a reciprocating blade, the wool, or other such material to be cleansed, is introduced. Another feature of the invention consists in the adaptation of

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mechanism to the above-described machinery for opening out the material previous to its being presented to the rollers and blades. For this purpose spiked rollers, or other such opening or carding apparatus, working in a dish, are adapted, and there is employed a transferring comb, in conjunction with the said spiked roller and fixed spikes, which draws off the material in detached tufts and presents it to the said roller and blades.]

36,728.—H. W. Putnam, of Cleveland, Ohio, for Improved Clothes-Wringing Machine :

I claim the side pieces, constructed in pairs and consisting of the parts, A B C, ratchet, D, cam, E, and pawl, F, in combination with the flanges or lips, I I, arranged as and for the purpose specified.

36,729.—John Richards, of Columbus, Ohio, for Improvement in Lubricators for Scroll Saw Stocks :

I claim the combination of the bearing and guide boxes, c d, intermediate casing, B, and saw stock, or the equivalent thereof, constructed, operating and arranged, substantially in the manner and for the purpose described.

36,730.—John Ridgway, of Boston, Mass., for Improvement in Operating Ordnance :

I claim, first, So arranging and operating an apparatus for mounting guns that they can be susceptible of being revolved in a vertical plane the whole circumference of a circle, substantially as described, whereby they can be successively and rapidly brought to bear upon any desired point, substantially as described.

Second, In combination with the above I claim any suitable arrangement of device for giving a horizontal movement around the circumference of a circle to the guns, as described.

36,731.—L. M. T. Riot, of Paris, France, for Improvement in the Manufacture of Soap :

First, I claim the employment in the manufacture of soap, of oils and fats treated, previously to the introduction of the alkaline lyes, with sulphuric or other acid, whereby the glycerine is rendered capable of contributing to and entering into the composition of the soap.

Second, I claim the previous preparation of oils with sulphuric or other acid, in such a manner that their glycerine may be thereby rendered capable of entering into the composition of the soap, so that soap may be produced by a cold process, by the mere addition of alkaline lyes to such oils, and especially by the particular mode of proceeding by the cold process hereinbefore described.

Third, I claim the mode herein described of manufacturing soap by a cold process, in which weak alkaline lyes are combined with olive or other oils, previously treated with an acid, for the purpose of converting their glycerine into a matter capable of entering into the composition of the soap.

Fourth, I claim the manufacturing of what is herein described as a rational soap, which may contain from four to ten per cent of soda ; such soap being prepared by a cold process, as described, and with ingredients the proportions of which may be regulated before manufacture.

Fifth, I claim the process herein described, in which tallows and fats, reduced to a liquid or fluid state, are treated with sulphuric or other acid, to convert their glycerine into a matter capable of entering into the composition of the soap, and are afterward combined with weak alkaline lyes so as to produce soap.

Sixth, I claim the manufacture of soap by means of oil or fat, first treated with sulphuric or other acid (in such manner as to render the glycerine thereof capable of entering into the composition of soap) and then combined with weak alkaline lyes when a hot process is used.

Seventh, I claim the preparation of olive oil for the manufacture of soap by a cold process, in so far as regards the treatment of such oil (before combining it with alkaline lyes) with sulphuric acid, in the proportion of six thousandth parts by weight of acid, to one part by weight of oil.

36,732.—Alfred Rix, of San Francisco, Cal., for Improvement in Door Latches :

I claim the arrangement of the angular oscillating bolt, A, in combination with the slotted transversely-moving slide, C, and notched cap, D, all constructed and operating substantially in the manner and for the purpose herein shown and described.

[This invention consists in the arrangement of an oscillating angular bolt which catches by its own gravity under a notched cap, in combination with a transversely-moving notched slide, in such a manner that by moving said slide in one direction the bolt is brought opposite the notch in the cap, and the door can be opened, and by moving the slide in the opposite direction, the bolt drops down by its own gravity and catches under the cap, when the door is locked, said parts being arranged in relation to each other so that the latch can be used equally well for left and for right hand doors.]

36,733.—William Rowan and J. M. H. Gill, of Freeport, Pa., for Improvement in Grain Screens :

We claim the adjustable bar, P, provided with the friction rollers, d d, or equivalent side-bearing surfaces for the screen, L, in combination with a crank or crank wheel, J, on which the upper or feed end of the screen rests, substantially as and for the purpose set forth.

[This invention consists in placing the screen on a fixed or adjustable bar, between friction rollers or other bearing surfaces, and operating the screen through the medium of a crank or crank wheel, all arranged in such a manner that a combined longitudinal and lateral vibrating movement is given the screen, whereby the same is rendered much more efficient in its operation than those previously devised, and also admitting of the screen being readily detached from its framing, when necessary for the purpose of cleasing, repairing, &c., &c.]

36,734.—G. K. Snow, of Watertown, Mass., for Improvement in Holders for Bills, Notes, &c.:

I claim as a new article of manufacture, the tray or trough when made with a cross section, substantially as shown, and provided with a presser connected therewith, and operating substantially as described.

Also the combination of two or more such trays or troughs and their respective pressers, substantially as shown.

36,735.—Thomas Spencer, of Syracuse, N. Y., for Improvement in Salting Meats :

What I claim in the process of curing meats is making the brine by washing the salt to be used for packing, and thereby removing therefrom the deliquescent salts, and then neutralizing the deliquescent salts in the brine, substantially as and for the purpose herein described.

36,736.—Miles Sweet, of Troy, N. Y., for Improvement in Curry Combs :

I claim a curry comb having separate trough-like comb bars, A, secured to a back, B, by lugs or projections, c c, formed in one piece with the back, and bent over upon and against the ends of the comb bars, substantially as herein set forth.

36,737.—T. R. Taylor, of Cleveland, Ohio, for Improvement in Machines for Making Nuts :

I claim the sliding frame, G, in combination with the jaws, I I, and dies, M and N, when constructed and operating substantially as and for the purpose specified.

36,738.—H. G. Thompson, of New York City, for Improvement in Machinery for Sizing the Backs of Carpets :

I claim, first, The combination of the rotating brush and the adjustable table, for the purpose described, the distance between the two being adjustable, substantially as and for the purpose described.

Second, The combination of the rotating brush and table, with the mechanism for moving and keeping the carpet distended, substantially as and for the purpose set forth.

Third, The combination of the rotating brush, the table, the mechanism for moving the carpet and keeping it distended, and the drying and smoothing cylinder, substantially as and for the purpose described.

And, fourth, The combination of the rotating brush, the table, the mechanism for moving and keeping the carpet distended, the drying and smoothing cylinder, and the interposed drying apparatus, or the equivalent thereof, for partially drying the sizing before it reaches the surface of the drying cylinder, substantially as described.

36,739.—J. A. Underwood, of Grand River, Iowa, for Improvement in Combined Harrow and Seed Drill :

I claim the combination of the adjustable wheel, L, swivel rod, K, and lever, M, with the wheels, D, seed box, I, seed cylinder, H, and rotary harrow, B, all in the manner and for the purpose herein shown and described.

[The object of this invention is to obtain an implement by which seed may be sown broadcast or in drills, and, at the same time, properly covered in the earth by a rotary plow, the parts being so arranged that the seed-distributing device may be readily rendered inoperative when necessary, as in turning at the ends of a field, and the seed-distributing and plowing device may be made to operate simultaneously by the forward movement of the machine.]

36,740.—P. S. Ward, of Millville, Iowa, for Improvement in Beehives :

I claim, first, The combination of the metallic plates, H H, hooks and eyes, a b, respectively, and rods, c c, with the two parts of a divided hive, when the whole is constructed and arranged in the manner and for the purpose set forth.

Second, The combination of the blocks, F, and buttons, h, or their equivalents, with the mortises, e f, and perforated plate, g, when constructed and arranged in the manner and for the purposes set forth.

36,741.—S. W. Warren, of Brooklyn, N. Y., for Improved Low-water Detector :

I claim the combination of the casing, b, with the steam and water pipes, c and d, the mercury reservoir, a, and an elastic diaphragm when arranged so as to operate together to work a valve, substantially as and for the purpose set forth.

36,742.—James Weed, of Muscatine, Iowa, for Improved Tree and Plant Protector :

I claim, first, The compound trellis, C C′, arranged substantially as and for the purpose shown and described.

Second, The arrangement of the simple and folding shutters, D D′, in combination with or without the trellis, C, as and for the purpose specified.

[The object of this invention is to protect trees, vines and plants against injury from winter and spring frosts, and it embraces a system of protection which it is believed secures perfect immunity from these evils.]

36,743.—Joshua Whittemore, of South Reading, Mass., for Improvement in Crutches :

I claim the crutch as made of two separate spring bars, A A, and the flexible arm rest, E, substantially as specified.

I also claim the india rubber or elastic buffer, I, in combination with the crutch, provided with a socket or buffer holder.

I also claim the combination of the spur, K, with the elastic buffer and the crutch.

I also claim the jawed socket piece made in manner and to operate as explained in combination with the crutch elastic buffer and the spur, substantially as described.

36,744.—M. G. Wilder, of West Meriden, Conn., for Improvement in Machines for Milling and Cutting Metals :

I claim the combination of the main spindle, M, with the revolvable ways, G, when so constructed and arranged as to allow the spindle to revolve through a complete circle both horizontally and vertically and the whole is constructed, arranged and made to operate substantially as herein described.

Second, I claim the combination of the main spindles, M, with the cutter holder, E, when so constructed and arranged that the article being wrought may be placed by it in every position, and at every angle with the cutter, substantially as herein described.

Third, I claim the combination of the cutter stock with the revolvable and rotating spindle and adjustable rack, as and for the purpose set forth.

Fourth, I claim cutting spirals either regularly or irregularly, varying the direction of the pitch line of the rack, substantially as described.

Fifth, I claim the combination of an adjustable dead center with the main spindle, in such a manner as that the center shall remain concentric with the spindle during the whole operation.

36,745.—Samuel Woolston, of Vincent Town, N. J., for Improvement in Marine Camels :

I claim the above-described improvement in camels, the same being provided with separate water compartments on the opposites sides and arms, or a platform, B, constructed, arranged and operated substantially as set forth for the purposes specified.

36,746.—J. R. Williamson & Samuel Forsythe, of Seabeck, W. T., for Improvement in Sawing Machines :

We claim, first, The arrangement and combination of the slotted roller arm, F, eccentric edge, i, of the standard, C, hook, c, and hand lever, E, all constructed and operating substantially in the manner and for the purpose shown and described.

Second, The arrangement of the triple crank lever, n, and slotted connection rods, l p, in combination with the two halves of the nuts, k or v, constructed and operating in the manner and for the purpose specified.

Third, The employment of the telescope tube, G, in combination with the screw, D, divided nut, k, and standard, C, substantially as and for the purpose set forth.

Fourth, The arrangement of the roller, J, in the adjustable standard, H, on the slab side of the log, for the purpose described.

36,747.—W. H. Wood, of Hudson, N. J., for Improvement in Piers and Bridges :

I claim a pier or bridge constructed of hollow cast-iron columns, B, fitted on wooden piles, A, driven into the bed of the river or stream filled with concrete or cement, C, and supporting by means of braced girders, D E, and arched flooring, F, covered with sand or cement, G, on which a trap rock or other suitable pavement, H, is laid, substantially as herein set forth.

36,748.—J. R. Williamson & Samuel Forsythe, of Seabeck, W. T., for Saw Gear :

We claim, first, The arrangement of the adjustable catches, g i, or their equivalents, in combination with the endless chains, b b′, and standards, C C′, constructed and operating substantially as and for the purpose described.

Second, The arrangement of the disk, m, vibrating brackets, o, and pawls, p p*, in combination with the shaft, D, and standards, C C′, as and for the purpose set forth.

Third, The arrangement of the adjustable inclined plane, F, in combination with the friction gear, E, constructed and operating substantially as and for the purpose specified.

Fourth, The arrangement of the index, u, and dial, u′, in combination with the inclined plane, F, as and for the purpose described.

Fifth, The additional inclined plane, H, and hinged roller, r, in combination with the inclined plane, F, and friction gear, E, constructed and operating substantially as and for the purpose set forth.

36,749.—V. R. Beach and Jube Day, of Independence, Iowa, assignor to themselves and C. L. Patrick, of Buchanan Co., Iowa, for Improved Sugar Evaporator:

We claim the construction of a pan with a central partition extending lengthwise, with a gate and strainer therein, for the uses and purposes herein set forth.

Second, We claim as our invention the arrangement of cross partitions with strainers at the bottom, in combination with the central partition, for the uses and purposes as herein set forth.

Third, We claim in combination with said pan and central partition as our invention, the construction of the cooler, for the uses and purposes as herein set forth.

Fourth, We claim in combination with an evaporator so constructed, as our invention, the arrangement of dampers in the fire furnace for the uses and purposes as herein set forth.

36,750.—Charles Beslay, of Paris, France, assignor to Edward Hecksher, for Improved Process of Electroplating Iron, Steel, &c. :

I claim the electro-chemical galvanization of iron, steel, &c., by combining with an intermediate metal applied in the manner herein described, the method of effecting the galvanization proper at ordinary temperature in solutions not concentrated, substantially as herein set forth.

36,751.—John Briggs (assignor to himself and J. J. Hair), of Louisville, Ky., for Improvement in Tobacco Presses :

I claim the box or body, A, constructed of spiral or scroll form in its transfer section, so to form a ledge or shoulder, a, and provided with a door, B, in combination with the bar or lever, C, screw rod, E, and nut, G, all arranged as and for the purpose herein set forth.

I further claim the manner of applying the lever, C, and the screw rod, E, to the box or body, A, to wit, by means of the links or double joints, D D, the link, F, bars, I I, and bands, e e, as described.

[This invention relates to a new and improved device for compressing tobacco plugs or rolls for boxing. The object of the invention is to obtain a simple implement for the purpose, one that may be much more readily manipulated than those hitherto arranged, and far more durable and less liable to break.]

36,752.—William Combe, of New York City, assignor to N. O. Hawkshurst, of Queens County, N. Y., for Improvement in Wooden Sieves for Gas Purifiers :

I claim the employment of a wooden grating having the opening made expanding downward to support the lime in dry lime purifiers in gas-works, constructed substantially as and for tha purposes set forth.

36,753.—J. B. Greely, of Summit, Iowa, assignor to himself and B. L. Latham, of Dayton, Ohio, for Improvement in Corn Planters :

I claim, first, Operating the seeding mechanism by means of an independent pole or stake, o, placed in the ground by the operator, in advance of the seeding mechanism, at the point where the seed is to be dropped, so that as the machine moves along the seeding mechanism, or some part thereof, will come in contact with the said stake and cause the seed to be instantly dropped at that point, all substantially in the manner herein shown and described.

Second, The combination with the seed slides, h, of the hinged stake strikers or trippers, n, rods, i, crank shaft, j, and spring, k, in the manner herein shown and described.

Third, The laterally standing inclined face, e, projecting point, d, and inclined cutting edge, f, on the furrow openers, E, as and for the purposes set forth.

Fourth, The combination of the spring pads, b, with the frames, A A′, and crossbars, C D, in the manner and for the purpose herein shown and described.

[This invention consists in the employment of a movable stake or pole, in combination with the seed-dropping device, in such a manner that by the action of said pole the seed slide is operated, and the seed deposited on the ground, and at the same time, by placing the pole down at the proper intervals, the seed or corn can easily be dropped so as to plow both ways ; it consists, further, in connecting to the rockshaft, which operates the seed slides, hinged trippers, one on either end, in such a manner that by raising the pole or staff the said trippers are turned up and the seed slides are permitted to return instantaneously to their original position.]

36,574.—C. E. Green, of Copenhagen, Denmark, assignor to H. F. Hammer, of Boston, Mass., for Improvement in Watch-chain Guards or Keys :

I claim the combination of the clearer, a, the key, C, the slider, B, and the socket tube, A, the whole being arranged substantially in manner and so as to operate as described.

36,755.—G. L. Witsil (assignor to himself and W. L. Wattis), of Philadelphia, Pa., for Improvement in Coal-oil Lamps :

I claim the two distinct tapering air flues, A A, in combination with the two deflectors, a′ a′, and the spacious wick chamber, B ; the same being constructed and arranged in relation to each other and the cap, C, substantially in the manner described and set forth, for the purposes specified.

35,756.—George Woods (assignor to Mason & Hamlin), of Boston, Mass., for Improvement in Operating Swells in Musical Instruments :

I claim the operating of the swell or swells of melodeons, harmonicons, or other similar instruments, by the contraction and expansion of the bellows or any elastic receiver connected with the instrument.

36,757.—Joseph Flint, of Rochester, N. Y., for Improvement in Plastering Trowels :

I claim forming the standard for attaching the handles of trowels with the transverse expansion, D, substantially as and for the purposes herein set forth.

36,758.—N. W. Northrop, of Greene, N. Y., for Improved Car Coupling :

I claim the compound union adjustable shackel bar, h, side springs, j j, slide bar, g, the springs, v v, and bracket, z, the slit, t, in shackel bar, the slits, b c, in the chamber, A, the horizontal latch, B, spring, f, rods, p, rocker, m, vertical bolt, y, shoulder rests, b c, all in combination with the rubber spring, bumper, D, in the manner herein before stated and for the purposes herein set forth.

36,759.—T. C. Andrews and J. Shinn (assignors to T. Cecil Andrews), of Leverington, Pa., for Engraved Plate Printing Press :

We claim, first, Arresting the motion of the plank, B′, for a certain time whilst the motive power continues in action, so as to admit of wiping and polishing the plate, B, by manual labor.

Second, the combination of the endless rails, C C, and the endless chains, c c, with the jaws or clamps, a a′, attached thereto, in the manner and for the purpose above described.

Third, The combination of the switches, s s, with the endless rails, C C, constructed and arranged substantially as set forth.

Fourth, The combination of the plank, B′, to which the engraved plate, B, is secured, with the jaws or clamps, a a′, constructed and operating substantially as described.

Fifth, Operating the pin, 1, by the lever, b, switches, s s, and jaws, a a′, as or at the time the latter are closed by the switches, s s, as set forth.

Sixth, The combination of the conical or V-shaped slots in pins, 1 and 2, and the wedge-shaped pins or lugs, 3 and 4, with the plank, B,' as described, to secure the latter accurately in position.

Seventh, The combination of the conical or V-shaped slots, 5 and 6, in the plank, B′, with the wedge-shaped pins or teeth, e e, in the jaws, a a′, for the purpose set forth.

Eighth, The scraper, M, in combination with engraved plates, arranged and operating as shown, for the purpose set forth.

DESIGNS.

1,664.—G. B. Owen, of New York City, for a Design for a Clock Case.

1,665.—C.A. Robinson, of New York City, for a Design for a Bottle.

NOTE :—The above list of patents numbers *sixty-seven*, and of these, TWENTY-EIGHT—nearly one half—were solicited through the Scientific American Patent Agency.—EDS.

INVENTIONS EXAMINED at the Patent Office and advice given as to the patentability of inventions, before the expense of an application is incurred. This service is carefully performed by the Editors of this journal, through their Branch Office at Washington, for the small fee of $5. A sketch and description of the invention only are wanted to enable them to make the examination. Address MUNN & COMPANY, No. 37 Park-row, New York.

TALENTS.—Disappointed men, who think they have talents, and who hint that their talents have not been properly rewarded, usually finish their career by writing their own history ; but in detailing their misfortunes, they only let us into the secret of their mistakes ; and in accusing their patrons of blindness, make it appear that they ought rather to have accused them of sagacity ; since it would seem that they saw too much rather than too little, namely, that second-rate performances were too often made the foundation for first-rate pretensions.—*Colton.*

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PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
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On application for Re-issue	$30
On application for Extension of Patent	$50
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On filing application for Design, seven years	$15
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The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian Spanish, and allother foreigners except the Canadians, te enjoy all the privileges of our patent system (exceptin cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

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Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years.. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention s susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the nventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

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Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

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All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

R. H. St. J., of Ohio.—A good black Japan varnish for iron work is made as follows :—Take 48 pounds asphaltum, fuse it in an iron vessel, and pour in 10 gallons of boiled linseed oil and add cautiously 7 pounds of litharge and 3 pounds of sulphate of zinc, and boil for two hours, then add 8 pounds of fused gum amber, 2 gallons of oil and boil till the whole has become a thickish mass. It is then cooled and thinned with turpentine to be applied with a brush or by dipping the iron articles into it. The articles which are japanned with this varnish must be dried in an oven. Common asphaltum, fused with boiled oil and thinned with turpentine, is used as a cheap varnish.

P. C., of Maine.—We are much obliged to you for again calling our attention to the subject of a false oath to which we replied on page 254. The little word "not" was omitted, which nullifies the whole paragraph. It should read thus : "If at the time of making application for your patent, you made oath through mistake that you were a citizen of the United States, your patent when issued would not be void. The Commissioner of Patents has no power to reissue a patent under such circumstances. Such a mistake does not fall within the designation 'defective or insufficient description or specification.' "

L. R. H., of Pa.—Several plans have been suggested for canceling postage stamps beyond the possibility of restoration. It is undoubtedly desirable to have the stamp perforated or cut ; but any plan which requires such a change in the mode of applying the stamp as you propose is objectionable, not only on account of the increased cost of envelopes, but of the difficulty of introducing it and compelling all persons to use it. The New York Post Office now uses a canceling punch which cuts the postage stamp without cutting entirely through the letter, and it seems to effect all that is required without any objection. Whatever plan is adopted must be applicable to the present mode of applying the stamps or to the stamped envelopes now in use.

W. W., of Wis.—We do not think the building block to which you refer is anywhere manufactured in this country. It was thought to be a good thing, but probably in the manufacture of it some defect appeared.

A. C. H., of N. J.—*Silliman's Journal* is published in New Haven, Conn. We think Burritt's paper is not now published.

F. M., of Baden.—We have sent your letter to Mr. Wilson, the patentee of the knitting machine.

H. C. R., of Ill.—We are not acquainted with any one engaged in the manufacture of tools for boring for coal. You can obtain such machinery in Pittsburgh.

W. U. F., of Boston.—We do not know where you can obtain Tuck's Steam Engine Packing, but by putting an advertisement of your wants in the SCIENTIFIC AMERICAN you will no doubt get the information you desire.

L. W. B., of Conn.—Messrs. Estabrook & Co., of Philadelphia, manufacture steel pens at their manufactory in Camden, N. J. Write to them at Philadelphia.

I. G. W., on Antietam Battlefield.—You state that infantry in passing over an open field exposed to concealed riflemen, always suffer dreadfully, and you suggest the adaptation of large shields placed on wheels and pushed before them, as covers to close upon the foe. The idea was suggested to us about a year ago by a correspondent, and you will find the illustration and description of such an invention on page 128, Vol. V. (new series) SCIENTIFIC AMERICAN.

H. S., of Mass.—The color on silk ribbons, to which you refer, is a full orange, and can be easily dyed by immersing the silk in a solution of annatto boiled with pearl ash ; then washing it well and immersing it in dilute sulphuric acid or a solution of alum for about fifteen minutes. It must be thoroughly washed before being dried.

H. R. H., of N. Y.—All explosions of kerosene lamps are due to some of the fluid becoming vapor and mixing with several volumes of atmospheric air. The explosion of the lamp to which you refer is similar to several that have been brought under our notice. The benzine, so called, of petroleum is the lightest product of the crude material. It can easily be detected by the mode described on page 68, current volume, SCIENTIFIC AMERICAN, where you will find the specific gravities of different oils, and much useful information on the subject of petroleum explosions.

O. J. P., of C. E.—Of course, two single engines, each of 6-horse power, connected to one shaft, will exert 12-horse power on that shaft, and convey such an amount of power to other machinery minus the friction.

G. D., of N. Y.—If the dates on your old copper coins are completely worn out it is not possible to "bring them out," for they have no existence. By boiling old copper coins first in aqua ammonia for a few minutes, then in dilute hydrochloric or sulphuric acid, you will make them clean without rubbing. The coins should be dipped in soft water in which a little potash has been dissolved immediately when taken out of the acid, or they will become blackish on the surface.

T. H. P., of Conn.—Gilding on glass is executed by mixing powdered gold with gum water and a little borax, and applying it with a camel's hair pencil. The glass is then heated in an oven or furnace sufficiently hot to fuse the borax, which cements the gold to the surface of the article. When cold it is polished with a burnisher. Names and fancy designs may thus be permanently put upon glass or china-ware. Glass may also be gilt with gold leaf by first applying strong parchment size with a camel's hair pencil, then when it is about half dry, putting on the gold leaf in the usual way. Of course, the design must be carefully put on with the size, so that the gold leaf will adhere to it alone. The size should be colored with a little carmine.

H. M. C., of N. Y.—The silky fiber which you have forwarded cannot be used as a substitute for cotton as the fiber is too weak, but with the proper machinery it may be made into a beautiful soft fabric.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, October 22, to Wednesday, October 29, 1862 :—

H. K., of N. Y., $20; L. M. S., of Ill., $20; H. H. C., of N. Y., $20; J. P., of N. Y., $47; N. E. R., of N. Y., $30; L. & W., of N. Y., $125; T. N. H., of Cal., $20; A. M. B., of Ill., $20; W. H. S., of Ohio, $20; S. R., of N. Y., $20; H. & A., of Ill., $20; W. S. H., of Ohio, $20; P. D. W., of R. I., $20; F. P. S., of N. Y., $60; F. W., of Mass., $45; C. W. T., of Ill., $20; J. O. C., of Wis., $45; G. M. C., of Me., $20; P. & McA., of N. Y., $45; H. S., of Mich., $45; F. G. S., of Mass., $20; W. D. A., of N. Y., $20; W. J. W., of N. Y., $30; D. W. C., of N. Y., $25; V. H., of N. Y., $50; M. & J., of N. Y., $25; C. B. L., of Mass., $28; J. B. C., of N. Y., $15; H. D. S., of N. Y., $15; A. C., of N. B., $65; K. P. K., of Vt., $40; J. S., of Pa., $25; I. A. K., of Wis., $15; G. C. G., of Ill.. $25; M. & A., of Wis., $42; J. B. S., of Ill., $25; C. G., of Mass., $25; C. G. S., of Mass., $15; D. H. F., of Md., $15; F. M. C., of N. Y., $15; W. E. E., of N. Y., $15; A. P., Jr., of Vt., $25; C. B. L., of Mass., $40; C. H. M., of N. Y., $15; A. H. E., of N. Y., $280; C. W. P., of N. Y., $15; W. S. T., of Iowa, $15; J. J. S., of N. Y., $35; F. D. D., of Ohio, $15; B. F. A., of Iowa, $15; S. H., of N. Y., $25; S. W., of N. Y., $20; S. L., Jr., of N. Y., $15; G. C., of N. Y., $10; G. T. C., of Mass., $25; F. P. S., of N. Y., $10.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from October 22, to Wednesday, October 29, 1862 :—

N. E. R., of N. Y.; W. J. W., of N. Y.; D. W. C., of N. Y.; T. V., of Cal.; J. B. S., of Ill.; G. C. G., of Ill.; V. H., of N. Y.; C. G., of Mich.; R. B., of Mich.; R. W. C., of N. Y.; M. & J., of N. Y.; C. B. L., of Mass.; J. J. S., of N. Y.; J. S., of Pa.; J. B. C., of N. Y.; S. H., of N. Y.; H. D. S., of N. Y.; A. C., of N. B. (2 cases); G. T. C., of Mass.

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PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

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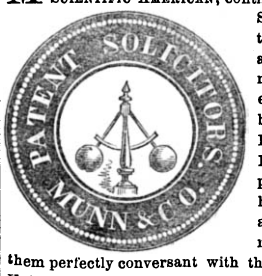

Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given a the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

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Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

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Your obedient servant, J. HOLT.

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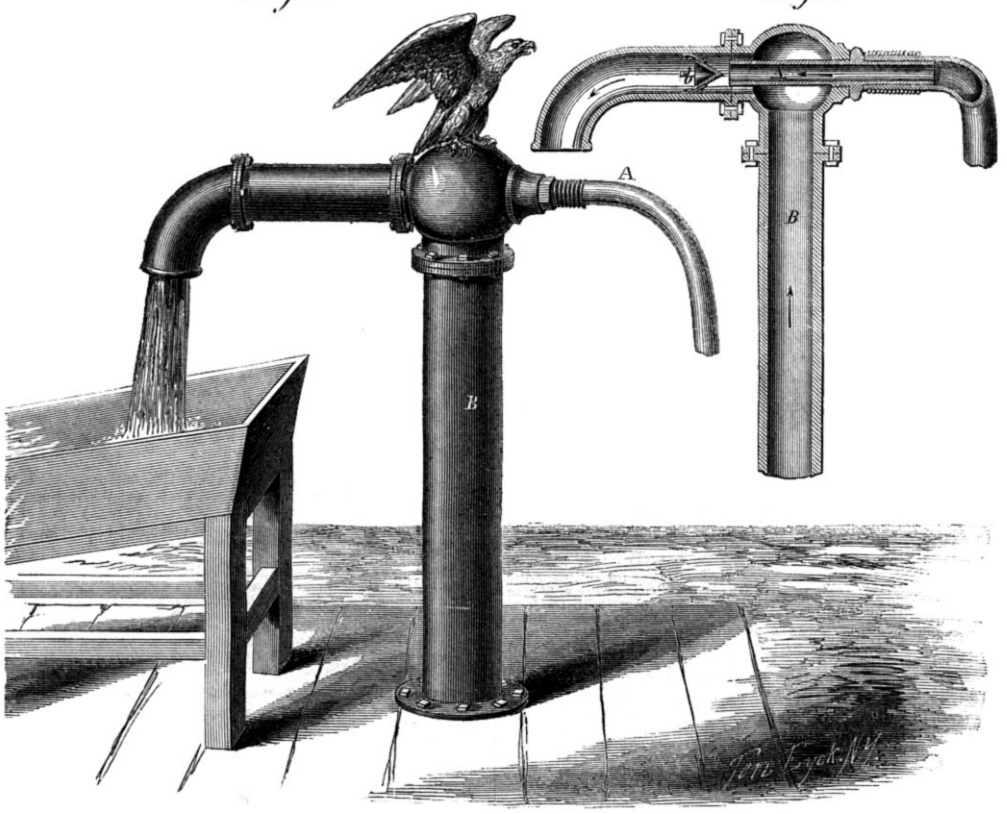
Improved Steam Siphon.

This cut is a representation, both in section and in operation, of an improved device for raising water from the holds of ships, barges, mines, or from any place or object where the scientific principles which control its action permit the use of it. The illustrations render it readily understood; Fig. 1 being a view of the invention in action, discharging the water into a tank or box. The steam pipe, A, which enters the globe, is to be made of any elastic material employed for that purpose, and is coupled to the boiler by the usual attachments. Fig. 2 is a section of the siphon, showing the steam pipe as it is continued across the globe, and the cone, *b*, a peculiarity of the instrument; at the mouth of it this cone is riveted to the casting, and is designed to spread the current of steam as it issues, and more thoroughly expel the air. The operation of the siphon is as follows:—

Fig. 1

Fig. 2



MARSH'S STEAM SIPHON.

The steam pipe being connected with the boiler, the vapor is admitted and rushes through in the direction of the arrow, carrying the air with it and thereby causing the water to rise from the ship's hold, through the pipe, B, by the vacuum thus created. When the water is once started, the velocity of the discharge is limited only by the impelling force, and continues to flow until the vessel is dry. As there are no valves about this machine or other obstructions in the passages, all foreign matters—sticks, grains, &c.—are carried out with the overflow. It occupies but little room, and would seem to be one of those inventions which perform a good amount of duty for the outlay incurred.

The patent for this invention was procured through the Scientific American Patent Agency, Oct. 14, 1862. Further information concerning it can be obtained by addressing Marsh, Lansdell & Co., No. 12 Vine street, St. Louis, Mo.

The Petroleum Trade of Canada.

A statement made by a Toronto journal shows the wonderful development of the petroleum trade in Canada West. From the wells at Wyoming station, on the Great Western Railway, between 2,500 and 3,000 barrels per week are exported; but so fast is the business increasing that application for transporting 60,000 barrels has been made to the company. In that portion of Enniskillen township in which petroleum is found, the annual receipts amount to $427,000, yet this is only a beginning. Almost every day brings strangers from England to the neighborhood, inquiring into the truth of the reports given out respecting the wells. The Canadian Oil Company of London have sent out an agent to make inquiries before commencing operations. It is reported that other companies are being formed in Great Britain to carry on the extensive business of barrelling, shipping and refining the article. One western firm have cleared $10,000 by the direct shipment of 2,000 barrels to England; and we hear that several vessels are now on their way to Sarnia to be loaded, while still larger quantities are going forward by rail to the Atlantic ports. The Great Western Railway Company are about to construct a branch road to the springs; a plank road to Dresden, on the Sydenham river, is also talked about. The making of barrels has already become a large business in that part of the country. Several refineries are being started in Enniskillen. Whether these all succeed in retaining the manufacture in the province, or whether it will be carried on principally in England, is yet conjectural. Among the other uses to which petroleum has been put is the making of gas for lighting houses, for which it is asserted to be the cheapest substance yet employed.

The Story of an Atom.

The atom of charcoal which floated in the corrupt atmosphere of the old volcanic ages was absorbed into the leaf of a fern when the valleys became green and luxuriant; and there, in its proper place it received the sunlight and the dew, aiding to fling back to heaven a reflection of heaven's gold; and at the same time to build the tough fiber of the plant. The atom was consigned to the tomb when the waters submerged the jungled valley. It had lain there thousands of years, and a month since was brought into the light again, imbedded in a block of coal. It shall be consumed to warm our dwellings, cook our food, and make more ruddy and cheerful the hearth whereon our children play; it shall combine with a portion of the invisible atmosphere, ascend upward as a curling wreath to revel in a mazy dance high up in the blue ether; shall reach the earth again, and be entrapped into the embrace of a flower: shall live in velvet beauty on the cheek of the apricot; shall pass into the human body, giving enjoyment to the palate, and health to the blood; shall circulate in the delicate tissues of the brain; and aid, bv entering into some new combination, in educing the thoughts which are now being recorded by the pen. It is but an atom of charcoal; it may dwell one moment in a stagnant ditch, and the next be flashing on the lip of beauty; may now be a component of a limestone rock, and the next an ingredient in a field of potatoes; it may slumber for a thousand years without undergoing a single change, and the next hour pass through a thousand mutations; and after all, it is only an atom of charcoal, and occupies its own place wherever it may be.

A LATE number of the London *Engineer* says: "The floating battery *Trusty* fitted with Captain Coles cupola and destined for experiments with the 300-pounder Armstrong gun firing a 150-pound cylinder, still remains in the basin at Woolwich under a protest from Captain Coles as not having been fitted in accordance with his design nor under his supervision."

THE farmers about Savannah, N. Y., are using six-cent papers of turnip seed as a circulating medium, in the absence of silver. They pass readily among agriculturists. A dollar or two in the medium would be nice in the pocket.

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FROM THE STEAM PRESS OF JOHN A GRAY

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